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**Journal**  
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*Gt. Brit. Army*

# Journal

OF THE

# Royal Army Medical Corps

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AN INVESTIGATION INTO THE KEEPING PROPERTIES  
OF CONDENSED MILKS AT THE TEMPERATURE  
OF TROPICAL CLIMATES.

BY LIEUTENANT-COLONEL W. W. O. BEVERIDGE, D.S.O.  
*Royal Army Medical Corps.*

DR. ANDREW BALFOUR drew my attention last year to the fact that apparently some brands of condensed milk will not keep in good condition in tropical climates, owing to the occurrence of certain changes which alter the character of the milk.

We had previously noted in the hygiene laboratories of the Royal Army Medical College that some samples of condensed sweetened milk became more solid and acquired a light coffee brown colour when incubated at 37° C. for periods exceeding one month. The change also occurred almost at once on heating unsterile condensed milks to 100° C.

This change has been noted by manufacturers of condensed milk, but since the brown colour diminishes on dilution with water, and there is no evident alteration in taste, the change has not been considered to be of much importance or injurious to health. There is no reason to suppose that this change is detrimental to health, but I think that the contents of such a tin of condensed milk would often be discarded from the very unusual condition presented.

There is also another point; although the bulk of the proteins



remains unchanged, a small proportion is rendered insoluble and separates as a curdy precipitate when the milk is mixed with water.

I have found that on incubating samples of sweetened and unsweetened, whole and skimmed, condensed milks at a temperature of  $37^{\circ}\text{C}$ ., the change does not generally take place in less than one month, and that it occurs more frequently in tins of milk to which cane-sugar had been added. Moreover, the change is always associated with the presence of bacteria in the milk—these mainly consist of spore-bearing bacilli and certain forms of cocci.

I have also observed that when tubes of fresh milk containing 40 per cent of added cane-sugar are sterilized for twenty minutes at  $100^{\circ}\text{C}$ . on five successive days the milk turns brown on the third day. After incubating for two days at  $37^{\circ}\text{C}$ . spore-bearing bacilli are found in all the tubes. In the course of preparation, sweetened condensed milk is rarely subjected to a temperature exceeding  $80^{\circ}$  to  $85^{\circ}\text{C}$ ., reliance being placed on the added sugar for its preservation. Unsweetened milks, on the other hand, are sterilized by an exposure to a temperature of  $100^{\circ}$  to  $113^{\circ}\text{C}$ . before canning, and again to a temperature of  $120^{\circ}\text{C}$ . after the tins have been sealed up (Scherff's process). It is evident, therefore, that the heat applied to sweetened milk is not sufficient to ensure sterility, and that the sugar merely acts as an antiseptic in temperate climates. Whenever the temperature is raised to about blood heat the spores become active and an incomplete form of bacillary fermentation of the proteins takes place with the production of acid, which doubtless assists in producing the changes in the milk.

It is well known that certain bacilli, such as the *Bacillus subtilis*, may form in milk a coagulum of the consistency of jelly with the precipitation of paracasein, and without any marked souring. The bacteria present in sweetened milk during incubation at  $37^{\circ}\text{C}$ . are doing their work under great difficulty owing to the presence of the sugar and a stage of liquefaction is not likely to be reached, although I have seen it in one case; in some few cases gas was present, but never in any large quantity.

It must be remembered that sweetened full and skimmed milks containing about 40 to 50 per cent of carbohydrate and only about 26 per cent of water are in a semi-solid state, and therefore do not give the sensation of a liquid on shaking, so that the change cannot always be demonstrated without opening the tin. The change cannot be perceived in store or on issue, and it is only the

immediate consumer who has his attention called to the fact that something appears to be wrong. In this way in tropical climates great waste and expense may be incurred, as sweetened condensed milk that has been stored may ultimately have to be discarded as useless.

Unsweetened milks, on the other hand, contain about 12 per cent of carbohydrate and about 65 per cent of water, and therefore the contents rattle on shaking the tin. Owing to the amount of water present such samples would not as a rule approach a state of solidity unless clotting occurred. As an example of this, a tin of unsweetened whole milk was opened, exposed to the air, resealed and incubated for fourteen days at 37° C. On opening the tin at the end of that time clotting had occurred, due to the presence of a Gram-positive staphylococcus, and the contents were in a solid state, but no discoloration was observable. The acidity showed a considerable increase, as would be expected. As a matter of fact, I have so far never met with a good sample of unsweetened sterile milk in which discoloration occurred on incubation, and doubtless unsweetened sterile condensed milks should keep sufficiently well in all climates for almost unlimited periods. The same applies to sterile unsweetened skimmed milks.

On analysis there appears to be no marked degradation change in the constituents of the milk, nor is there any marked alteration in their relative proportions, with the exception of a slight increase of the reducing sugars and acidity. In some cases a slight pre-formed digestion has apparently occurred, as traces of proteoses and peptones which are also found in normal condensed milks may be detected. These, perhaps, would probably merely serve to render the milk more digestible.

In normal fresh milk the acidity amounts to from 12 to 19 degrees, whereas in condensed milks it reaches from 34 to 64 degrees. After incubation the acidity of sweetened milks, due to bacterial fermentation, may show a further rise of 29 or 30 degrees.

The contents of a tin of milk which on incubation have become coloured as the result of bacterial action will be found to have a greater consistency and to be less miscible with water. Beyond this, and a slight rise in acidity, there is apparently no change that would render the milk unfit for consumption. Tyrosin crystals are found in considerable quantity, indicating that there has been some disintegration of the proteins.

## THE PROBABLE CAUSE OF THE BROWN COLORATION.

At a temperature of 37° C. the change takes place very slowly, but on raising the temperature to 100° C. the change becomes rapid, though less intense, an exposure for at least one hour being required. Therefore heat is an important factor. Milks kept at the temperature of temperate climates do not usually show any change in colour.

I have found that fresh milk heated to 100° C. does not change colour, and on the addition of 40 per cent cane-sugar no coloration results, except on prolonged heating; if, however, time be allowed for the production of sufficient acid by the action of bacteria, browning will result. Sweetened condensed milks on heating to 100° C., or on incubation at 37° C. for a period of one month, change colour, but unsweetened sterile condensed milks remain colourless at such temperatures. Unsweetened condensed milk containing active bacteria shows the change after seventeen days' incubation at 37° C., as shown by the following experiment:—

A tin of unsweetened full milk, which had been incubated at 37° C. for seventeen weeks without showing any change, and had proved on examination to be sterile, was inoculated with a culture recovered from condensed milk, which was apparently the *B. subtilis*. The tin was resealed and incubated for a further seventeen weeks at 37° C. On opening the tin the contents showed some flakes of coagulated protein, and the ordinary colour of the milk had changed to a decided brown. The brown colour, though decided, was yet not so marked as in the case of sweetened milks containing cane-sugar. An examination of the milk used in this experiment was made at the end of seventeen days, when it was found that although the milk had changed colour after the introduction of living bacteria, the change being accompanied by increase of acidity, yet no change whatever took place even in seventeen weeks when bacteria were absent. Therefore it would appear probable that bacterial fermentation may help to bring about the change by causing an increase of acidity.

It is a well-known fact that an aqueous solution of glucose will turn brown on heating, and the change in colour is much more marked in the presence of an acid. The brown coloration in condensed milks may be increased in intensity by artificially increasing the acidity before heating.

In sweetened condensed milks, owing to increased acidity due to bacterial fermentation, a varying degree of hydrolysis of the cane-sugar occurs, the sugar undergoing an incipient decomposi-

tion with loss of water and the production of glucose and fructose. This inversion is favoured by the amount of acidity—the greater the acidity the greater the change—by the presence of a metallic salt such as iron, and by an increase of temperature. Cane-sugar may be hydrolysed by normal sulphuric acid at  $20^{\circ}$  C., whereas milk-sugar requires prolonged heating at  $80^{\circ}$  C. to effect the change. In the case of unsweetened milks the amount of glucose formed by fermentation is small and the brown colour produced may not reach a very marked degree, but in the case of sweetened milks the amount of glucose formed on hydrolysis may be considerable and hence a darker colour may be expected. The hydrolytic power of the acids present also increases with the rise of temperature. At a temperature of  $100^{\circ}$  C. the amount of acid already present in condensed sweetened milk is sufficient to cause the necessary hydrolysis, but at the lower temperature a higher acidity is probably necessary to produce the change which is also a slower one, depending upon the rate at which acids are formed by the bacteria called into active growth at  $37^{\circ}$  C. At a temperature of  $100^{\circ}$  C. the brown colour is never so marked as in the case of milks incubated for many weeks at  $37^{\circ}$  C., probably because there is less acid present. In both cases after exposure to heat there is an increase of the reducing sugars.

I have found that in the presence of living bacteria a small amount of the cane-sugar is inverted during the incubation of sweetened milk at  $37^{\circ}$  C. A tin of sweetened full cream milk, containing 12.67 per cent of reducing sugar, was incubated for six months; on opening the tin the contents were very brown in colour, contained traces of iron in the ferric state, and the amount of reducing sugar had increased to 16 per cent, an increase of 3.33. The acidity had increased by 17.5 degrees. Such high figures as 16 or 17 per cent of lactose, recorded by some analysts in certain brands of sweetened milk, are possibly due to inversion of the cane-sugar, which would increase the amount of reducing sugar.

A brown coloration of canned foods is frequently caused by the presence of basic sulphate of iron. The tins containing the milk have not a sufficient coating of tin to preclude the possibility of iron from the steel base going into solution in the milk. The presence of iron may be at once detected by rinsing out the tin with dilute sulphuric acid, and then adding ferricyanide of potassium to its inner surface, or by using Walker's method<sup>1</sup> for

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<sup>1</sup> "The Detection of Pin-holes in Tin Plate," by William H. Walker, *Journal of Industry and Engineering Chemistry*, vol. i, 5, May, 1909.



the detection of pin-holes in tin plate, when the blue ferrous ferricyanide is produced where the iron is exposed.

The iron exists in the milk in the ferrous state, probably as ferrous sulphate. This being practically colourless in the amount usually found in the milk is not perceptible to the eye; but should, however, oxidation to the ferric state take place the brown colour is at once observable. Iron in the ferric state is found in milks which have been incubated and have turned brown—but only in traces. Ferrous sulphate is rapidly converted into ferric sulphate on heating in air, and a solution of cane-sugar when heated with a little ferrous salt is coloured brown on conversion of the salt to the ferric state, and hydrolysis of the sugar occurs at the same time. Ferric sulphate colours lactose only to a very slight extent.

It is conceivable that, with an increased acidity in the milk, more iron is dissolved from the tin, and hence any change of colour would be more marked when bacterial action is present.

The following facts serve to prove that possibly in a few cases the brown coloration is in part due to iron in the ferric state, or is increased by its presence:—

(1) The brown coloration is not always diffused equally throughout the milk, and is often found to be very marked where the nearly solid milk has been in contact with the tin. In sweetened milks after incubation dark brown patches are noticed at the bottom of the can, and in the case of milk cans punctured and resealed, at the site of puncture.

(2) The sugar recovered by alcoholic extraction contains some iron.

(3) The brown colour clings most persistently to the casein and after separation iron can be shown to be present in it.

(4) One hundred cubic centimetres of a solution containing 40 per cent cane-sugar were placed in a clean milk can from which all trace of acid had been removed. After sealing up, the tin was incubated at 37° C. for fourteen days. When opened it was observed that the solution had changed to a brown colour of the depth and shade usually found in sweetened milks which had become coloured on incubation, and iron was found in the ferric state. Some hydrolysis had also occurred since reducing sugar amounting to 0.23 per cent was present. The total acidity amounted to 14 degrees.

I do not for a moment suggest that the presence of iron alone accounts for the brown coloration, but it is possible that in some

cases it may assist and may cause a deeper coloration than would be found in other cases.

To determine the effects of the addition of cane-sugar in the amount usually found in condensed sweetened milks, or of iron or of both, to fresh milk, some experiments were carried out which are shown in the table:—

CONDENSED MILK AND FRESH MILK WITH THE ADDITION OF SUGAR OR IRON, OR OF BOTH, EXPOSED TO A TEMPERATURE OF 100° C. FOR ONE HOUR.

Sample	Acidity in degrees	Containing 40 per cent cane-sugar = +, without cane sugar = -	In the case of fresh milk the addition of 1 c.c. of 10 per cent ferrous sulphate = +, and no ferrous sulphate = -	Presence of air = +, absence of air = -	Result in change of colour
Condensed, full cream, sweetened milk, under vaseline to exclude air. Non-sterile	41	+	Traces of iron present	-	Turned brown
Condensed, full cream, unsweetened milk. Non-sterile	42	-	do.	-	" "
Condensed, full cream, unsweetened milk. Non-sterile	42	-	do.	+	" "
Condensed, full cream, unsweetened milk. Sterile	34	-	do.	+	No change
Canned, whole milk, unsweetened. Sterile	20	-	do.	+	" "
Fresh milk .. ..	12	-	-	+	" "
" " " " " "	12	+	-	-	" "
" " " " " "	41	+	-	-	Turned light brown
" " " " " "	41	+	-	+	" " "
" " " " " "	12	+	+	-	Turned brown
" " " " " "	41	+	+	-	Turned a very dark brown
" " " " " "	41	+	+	+	Turned dark brown
" " " " " "	41	-	+	-	Turned light brown
" " " " " "	41	-	+	+	" " "
" " " " " "	12	+	-	-	Continuous heating for 7 hours; turned brown on concentration*

\* Caramelization.

From these results it would appear that the change to a brown colour may depend on the amount of acid present acting on the sugar, particularly cane-sugar. The addition of iron causes a darker coloration than that found in the presence of sugar alone, and the change would appear to take place equally well, whether atmospheric air is present or excluded.

Another possible cause has occurred to me, but as yet I have had no opportunity to verify it. It is, that the tyrosin which occurs in appreciable quantities in all forms of condensed milk may possibly be transformed by the action of an oxidase, of the nature of tyrosinase, into a brown pigment, the action being assisted by a moderate degree of acidity and an increased temperature. The action of such diastases is recognized as a cause of the production of animal or vegetable melanins. Owing to the want of efficient sterilization, such an action would be more likely to occur in sweetened condensed milks than in the unsweetened varieties.

#### CONCLUSIONS.

The change in colour of certain kinds of condensed milks in tropical climates is presumably due to brown colour being developed by reducing sugars in solution at a certain temperature, and is likely to be more marked with an increase of acidity due to bacterial fermentation; the presence of iron in the ferric state also plays a part in the production. In sterile condensed milks, chiefly found among those brands which contain no added sugar, changes are not noticeable. Sterile uncondensed tinned milk also shows no change even after incubation at 37° C. for many months.

The increase of acidity is brought about by bacterial activity resulting from the increased temperature, and hydrolysis of the sugar follows. The bacteria concerned in the change are spore-bearing bacilli which produce an acid fermentation of the proteins. In milks containing only Gram-positive staphylococci a brown colour is probably never produced. It would seem that the depth of the brown colour is dependent on the amount of reducing sugar produced or of iron present, and is likely to be more intense in sweetened milks, owing to the reduction of the added cane-sugar.

The increase in consistency, noticed in connexion with the brown coloration in sweetened milks, is also due to bacillary fermentation, and some of the protein is consequently rendered insoluble.

For Service use in tropical climates there is no doubt that to obtain better value, and to obviate the risk of such a change occurring, especially when milks have to be stored for considerable periods, only those brands of unsweetened milks which have been proved to be sterile should be selected.

PRELIMINARY NOTE ON THE PRESENCE OF AGGLUTININS FOR THE *MICROCOCCUS MELITENSIS* IN THE MILK AND BLOOD-SERUM OF COWS IN LONDON.

By MAJOR J. C. KENNEDY.

*Royal Army Medical Corps.*

IN placing on record the fact that in high dilutions the milk and the blood-serum of certain cows in London dairies agglutinate the *Micrococcus melitensis*, I do not wish to appear an alarmist. I do not wish to be understood to say that the cows are therefore capable of transmitting undulant fever. It is possible that this agglutination reaction of the milk may have some explanation other than that the cows are infected with the *M. melitensis*, and were it not that I am on the point of sailing for India, and am unable to complete the research, I should not have published it until some definite conclusion had been arrived at.

At the same time I feel it to be my duty to record my observations so that further investigation may be carried out. I think that the possibility of a *Melitensis* infection of the cows in this country should not be lightly thrust aside. I have heard of two cases of undulant fever in people who had never been out of England, and it is possible that there are others undiagnosed.

During May of this year I received from Sir Ronald Ross some samples of goats' milk to test for agglutination of the *M. melitensis*. In carrying out the test it occurred to me to put up a control with a sample of cows' milk (Sample "A."). To my great surprise the cows' milk gave a complete positive reaction in 1—20 dilution. I repeated the test with a sample obtained direct from the milkman's cart, with the same result. During the course of my experiments I tested the same milk supply on eleven different occasions, and only on two of these occasions was the reaction negative.

Thereupon I tested twelve other samples taken from different milk supplies in London, and obtained a complete positive reaction in 1—20 dilution in four, incomplete in one, and a negative reaction in seven.

These samples were all "mixed," that is the milk from a number of cows mixed together, and the next step, obviously, was to obtain a sample from each cow individually. This I was able to do through the kindness of Sir Ronald Ross and Dr. W. H. Hamer, of the London County Council.



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I visited two dairies in London and obtained samples from each cow. These were collected under my personal supervision in sterile test tubes or bottles, and I carried out the test half an hour later before the milk had time to undergo any change.

In the first dairy (M—) there were nine cows, of these one (No. 1) gave a very marked reaction to *M. melitensis*, agglutination being complete in 1—300 dilution. A mixture of the nine samples reacted incompletely in 1—20 dilution.

The second dairy (W—) contained thirteen cows. Of these two (Nos. 2 and 13) gave very marked reactions, and one (No. 5) was not so complete. The end points of agglutination will be seen by referring to Table I.

I was then able to test the blood-serum of the two cows which had a high milk reaction (W. 2 and W. 13) and found a high agglutination with the *M. melitensis* (*vide* Table I).

TABLE I.—AGGLUTINATION REACTIONS OF COWS.

Cow		Dilution										
		1—10	1—20	—40	1—50	1—60	1—80	1—100	1—200	1—250	1—300	1—500
M. 1 milk	..		+	+		+	+	+	+	+		
W. 2 milk	..		+	+		+	+	±		—?		—
„ serum	..	+	+		+		+	±	±		—	
W. 5 milk (1)	..		±									
„ (2)	..		—	—		±	+	±				
W. 13 milk	..		±	+		+	+	+		+	+	±
„ serum	..	+	+		+		+	+	+		—	

Attempts to isolate the organism from the milk have not been successful. Milk from M. 1 was plated out and gave numerous colonies of a small Gram-negative streptococcus producing acid in glucose and not agglutinated by melitensis serum. W. 2 and W. 13 were plated out on four different occasions without success. The samples were taken from each quarter of the udder and from the whole milk, the deposit after centrifuging and the cream were also plated out. These two milks contained diphtheroids and fine streptococci. In addition W. 2 contained a small Gram-negative cocco-bacillus which on a glucose-nutrose-agar plate produced a colony very like the *M. melitensis*. The colony took four days to become visible to the naked eye and subcultures on agar took three days to appear. The colonies on agar were not so amber coloured as the *M. melitensis*, and when picked up on a needle had the colour of paste and were of a gelatinous con-

sistency. The growth emulsified readily in saline but was not agglutinated by melitensis serum. As it happened, the two cows W. 2 and W. 13 were running short of milk, and the owner had arranged to have them replaced. They were to be sold and slaughtered, and I was looking forward to being able to get cultures from the internal organs, but at the last moment I found that they had been sent to the Midlands.

It is necessary, in support of the above statements, to give some details of my experiments and indicate how they have been controlled.

There is no doubt that my statements will be received with some scepticism and be submitted to considerable criticism, and perhaps I may be able to anticipate some of it. If this reaction is not indicative of infection with the organism of undulant fever, what is its explanation? Is it a matter of faulty technique, or is the agglutination of the *M. melitensis* by cows' milk not necessarily specific?

It occurred to me at first when dealing with the "mixed" samples that the reaction might be due to chemical changes, such as increased acidity, or to the products of growth of other bacteria, but the examination of samples taken direct from individual cows proved it was not so, also that the addition of preservatives did not come into the question. With regard to the technique of the test I have carefully eliminated the fallacies.

*The strain of M. melitensis used* was one obtained from Malta two and a half years ago and had been carefully and repeatedly tested as to its agglutinability. It showed no sign of auto-agglutination and was not agglutinated by a 1—10 dilution normal serum. Further, it was compared with two recently isolated strains, one obtained from Dr. Zammit, of Malta, in June, 1913, the other from Dr. Eyre, of Guy's Hospital, being the first subculture from the spleen of a guinea-pig which died in May, 1913. Both these strains gave comparable results with my own when put up with various milks, in fact they both gave slightly higher readings, e.g., were more readily agglutinated.

*The technique* was that worked out by the Mediterranean Fever Commission, and finally adopted by us as giving the most reliable results. The emulsion, a fairly strong one, was made up in saline from a three to four day culture on agar. The milk, to which a trace of formalin was added, was diluted 1—10 parts with saline solution. Equal parts of diluted milk and emulsion were then mixed together and drawn up into a sedimentation pipette. The

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presence or absence of a deposit of agglutinated bacteria was ascertained after standing for eighteen to twenty hours at room temperature. The deposit was frequently examined microscopically to confirm the naked-eye readings. Controls were always put up: (1) equal parts of emulsion and saline solution; (2) milk diluted 1—10 or 1—20 with saline solution. It has been stated by some workers that when testing a serum it should be heated to destroy the non-specific agglutinin. In my own experience I have never found this necessary, provided that the strain of *M. melitensis* used is reliable. Nevertheless, it is a point to be investigated in connection with the milk reaction, and the only experiment I was able to carry out failed because the sample of milk I happened to use did not contain any agglutinins.

*Does the Fat in the Milk Influence the Reaction?*—It was noticed on examining the sedimented bacteria that the clumps generally contained a quantity of fat globules, and it was suggested that the presence of the fat might constitute a fallacy. Therefore, samples of milk known to react were treated with rennet and the clear whey tested in the same manner as the whole milk. The agglutination reaction of the whey was found to be identical with that of the whole milk.

A further experiment suggested by the above was the testing of the filtrate after passing the milk through a candle. In the first experiments a Berkefeld candle was used, and in the second a Doulton porcelain candle. The filtration was effected by means of a water vacuum pump. In some cases (goats' milk particularly) it was extremely difficult to obtain any filtrate, but the addition of an equal volume of saline to the milk solved the difficulty. The filtrate varied in appearance from that of pure water to a straw coloured or yellow fluid. The agglutination reaction of the filtrate was in every case found to be either very much reduced or totally absent (*vide* figure, p. 14). This result was a surprise, and it was thought that here perhaps some difference might be found between the agglutinins in cows' milk and the specific ones in goats' milk. Therefore some samples of milk from infected goats were obtained from Malta through the kindness of Dr. Zammit. Two of these gave a high reaction, viz., No. 1,670 complete in 1—240 (end point not reached), and No. 1,671 complete in 1—80. After filtration the reactions fell to 1—20 and 1—4 respectively. Therefore the specific agglutinins behaved in the same manner as the cows' agglutinins and were held back by the filter. Lack of time has prevented me working at this phenomenon, and I merely state the facts as found.

An additional observation was made, however, that whey, when filtered through a candle, also loses a large amount of its agglutinin, but judging from one of the only two experiments carried out the loss may be not nearly so great as in the case of the whole milk.

TABLE II.—SHOWING LOSS OF AGGLUTININS AFTER FILTERING MILK AND WHEY.

Sample	Agglutination reaction	Agglutination reaction of filtrate	Candle used
Mixed milk "A," 20.5.13 ..	+ 1-20	- 1-2	Berkefeld.
" 8, 20.5.13 ..	+ 1-20	- 1-2	"
" "A," 8.6.13 ..	+ 1-40	- 1-40	Doulton.
" "A," 17.6.13 ..	+ 1-20	+ 1-2, - 1-10	"
" "A," 3.7.13 ..	+ 1-40	- 1-2	"
Goat 1670 .. ..	+ 1-240	+ 1-20, - 1-40	"
" 1671 .. ..	+ 1-80	+ 1-4, - 1-10	"
Mixed milk "A," 26.5.13 ..	+ 1-20		
Whey "A," 26.5.13 ..	+ 1-20	- 1-10	"
Mixed milk 10, 20.5.13 ..	+ 1-10, $\pm$ 1-20		
Whey 10, 20.5.13 ..	+ 1-10, $\pm$ 1-20	+ 1-10, - 1-20	"

*The Acidity of the Milk.*—The "mixed" samples were always very acid, and before samples from individual cows were obtained it was thought that the reaction might depend to some extent on the acidity. Neutralizing the milk and testing the degree of the reaction before and after, made it evident that neutralizing rather increased the agglutinative power than otherwise.

*The Question of Preservatives* need not be considered. The trace of formalin, which is used in the sedimentation test, has no agglutinating effect whatever.

## SUMMARY.

(1) Agglutination of the *Micrococcus melitensis* is produced by high dilutions of both the milk and the serum of certain cows in London.

(2) Of thirteen samples of "mixed" milk from thirteen different dairies in London, five gave a positive reaction, one an incomplete, and seven a negative.

(3) The milk of three out of twenty-two cows gave a complete positive reaction, that of one was indefinite, and the remainder were completely negative.

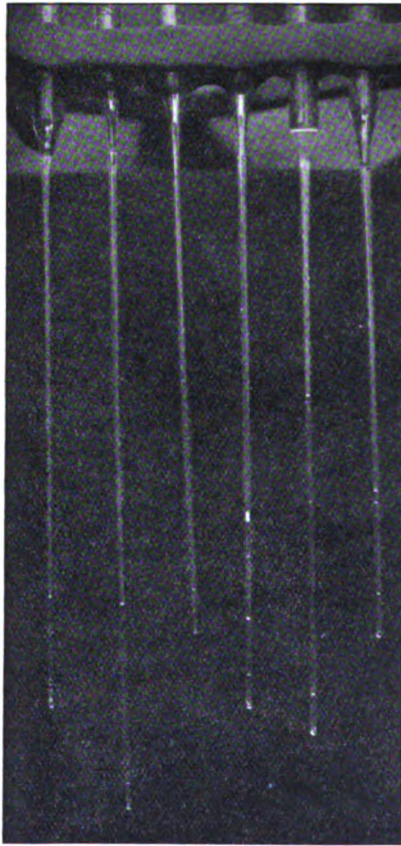
(4) The serum of two (the only ones tested) of the three cows

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whose milk gave a positive reaction also had a high agglutinative value for the *M. melitensis*.

(5) The *M. melitensis* has not been isolated from the milk on the few occasions on which it has been plated out.

Photograph showing the sedimentation test for the presence of agglutinins for the *Micrococcus melitensis* in cows' milk and demonstrating the absence of a reaction after filtering the milk through a Berkefeld candle.



6 5 4 3 2 1

1. Control—Emulsion of *M. melitensis*. No deposit.
2. Control—Milk diluted 1—10 with saline. No deposit.
3. Milk + *M. melitensis* emulsion, dilution 1—20. Marked reaction.
4. Control—Filtrate.
5. Filtrate + *M. melitensis* emulsion, dilution 1—2. No reaction.
6. Filtrate + *M. melitensis* emulsion, dilution 1—20. No reaction.

## MAN AND NATURE.

BY COLONEL R. H. FIRTH.

WRITING as one who, for many hours together, has been able to contemplate Nature in some of her grandest, most awe-inspiring and even mystical aspects, I may be pardoned for putting together some reflections upon those causes of, and the effects involved in, that wide range of intuitions and emotions which a contemplation of Nature stimulates without any definite appeal to conscious reasoning processes. The hypercritical reader may say the pages of the journal of a medical corps are not the place for these philosophizings. To him I would say that a medical corps is a scientific corps whose outlook should be and is wider than the study of purely technical topics of a professional life, and that the scientific status of that corps involves not only catholic views but that very catholicity is a measure of its culture. The day is not yet when we must think that the highest wisdom is enshrined in biological facts; all these have their beauty, and even a mysticism of their own, but they are hurtful if advanced as an adequate description or explanation of existence at large and of life in particular. Science describes Nature, but it does not feel Nature; still less does it account for that sense of kinship with Nature which impresses every thoughtful man. Even primitive man interpreted the events and changes around him on the analogy of human activities and as manifestations of living wills. He could not do otherwise, for he knew of no mode of activity other than his own. The beast of prey, the noisy brook, the rustling of the trees, the mountains, the avalanches, the sun, the moon, the stars, the clouds, the storm, the ocean, the caverns, light, darkness, water and fire, were all phenomena on which his intellect worked, producing in him emotions of awe, terror or joy. To all these he ascribed mental life like his own. From these beginnings each century has brought a wider outlook, but even now the original animism persists, and is to be found not only among the uninstructed but in the ranks of philosophers and scientists. Mythology succeeded animism, to be followed by many quaint and curious theories; but, though these beliefs have all gone, the fundamental belief in some form of universal life or consciousness has survived the ages, and in this day a true wave of mysticism is passing over all civilized nations. It is welcomed by many and distrusted by more; still it is a factor

at work among thoughtful men and one worthy of our notice. The crude and uncritical animism of primitive times fell before the philosophers and scientific inquiry, and as knowledge of natural law grew so the idea of mentality in external nature withered. The climax of the reaction found expression in mechanical views of the universe. Just as criticism undermined the immaturities of the older animism, so has it undermined an exaggerated and soulless materialism. We find ourselves now in an atmosphere in which speculation is tending back to a critical animism, but enriched by all that physical science can give, and Man begins to realize that the connexion between body and soul defies the old distinctions between matter and mind, and that a universal life is pulsating in the whole. This article, therefore, starts from the point of view that life is something more than a blind play of physical forces, but that genuine impulses, not mechanical strains and stresses, are the causes of the ceaseless striving to a fuller consciousness and richer complexity of experiences.

In attempting to discuss the subject, it is difficult to avoid a certain metaphysical element, which, such as it be, assumes three spheres of existence; that which is within the individual mind, that which is external to the individual mind, and that in which both these two are fused together. One accepts the hypothesis of evolution and the more certain conclusions of science, but one demands as a fundamental proposition that the world of external objects must be essentially of the same essence as our perceiving minds. As to what one means by "Nature," it is held to cover only such natural objects as are independent of, and unaffected by, human activities.

Equally difficult, in contemplating Nature, is it to avoid the perilous danger of mysticism. As a matter of fact, a complete divorcement from mysticism is impossible to the true student of Nature, but its pitfalls are negligible if we are careful to avoid its obscuring our ideas both as to the Absolute and Reason. In its full sense, mysticism is not easy to define, as it embraces a large group of special experiences which deal with material supposed to be beyond the reach of sense and reason. In a word, we are carried back to the illusive mysteries of the Greeks, to the subtleties of the ascetic East, and to some aspects of the Platonic philosophy. So far as this article is concerned, it may be stated at the outset that it is planned without ulterior motive and has no aim to shed light on any royal road to communion with the ultimately Real. One repudiates the idea of the ultimately Real being a super-sensuous,

super-rational or unconditional Absolute One, but by allowing value to Nature, one recognizes the polyphasism and reality of phenomena, that the world in which we live is real, and that this life is no dream. By discarding all attempts to crystallize our views of ultimate Reality, we seek only to analyse Man's communings with Nature and see how far that communion is existent, possible and helpful towards placing ourselves in living touch with the basis of existence.

Man's communion with the cosmos, of which he himself is but a part, must be grounded on the reason which permeates the whole. All that communion with Nature is based on sense perception which is but a form of intuition and independent of any conscious exercise of reasoning powers. Although no thought can create a sensation, yet the sensation of Nature's phenomena is at the base of all thought on Nature. These sensations furnish material which Reason works up. Therefore, any reflections dealing with the phenomena presented by Nature by sensation have the threefold task of finding out the nature of the object, of tracing their causes and of tracing their effects. If each intuitional experience seems to stand alone, our Reason groups those single experiences together, inquires as to their condition and makes them subserve definite conscious purposes. In so doing Reason has to take care that the form of thought is not confused with the matter of thought. With that safeguard coupled with intuition, supported by conscious reasoning processes, man gains much of the knowledge which is power and comes face to face in Nature with the idea of a larger self, of misgivings of a creature moving about in worlds not realized, and of obstinate questionings of sense and outward things. In this spirit we can and should consider Man's relation to Nature.

### I.

Anyone sitting down in some solitary spot and contemplating Nature, is at once confronted with the thought, am I an interloper or am I an integral part of this whole? Unless he be a modern Pygmalion and wishful to beseech Aphrodite to animate the world for him, he recognizes that he himself is the highest outcome of a vast upward movement in the sensuous world around him. As he reflects, he even goes farther than that; he realizes that his own knowledge links him to other ages and other worlds. He cannot suppress the thought that cosmic evolution is one vast whole, and that he himself has his own special place in that whole, and that Nature all around him is alive, and that man is an



integral part of living nature. He sees the beauty and the ugliness as well as the utility of Nature, and realizes that in the beauty and ugliness which he sees around him there is the smile of a spiritual and friendly Being. These aspects of beauty and ugliness in Nature are agents in moulding man's own character; they suggest ideas of life and death, of power and weakness, of hope and despondency. He recalls the early gropings of his race for truth, and understands how these external phenomena have stimulated the imaginations of the infant human race and, even now, exercise a power to move the sensitive mind. If what he sees is so wonderful, what must be that which he does not see?

If Man and Nature are therefore livingly related, the question is, what is the factor which enables physical phenomena to exercise an influence on man's psychic development? Apparently, what one may call intuition. By this one means that passing of the mind, without reasoned process, behind the phenomenal world into a world beyond the reach of sense. We may dismiss at once the Oriental ascetic idea that this intuition is purely passive or potent only after the mind is quieted and the will suppressed; on the contrary, one regards the mind as going out to meet that which comes to it. Let anyone who has contemplated calmly the stars, the ocean or the mountains, think of the feelings which these aspects of Nature have raised in himself; doing so, who can deny that there was ever some movement from within, be it desire, sympathy or emotion? The answer comes clearly that the self was active, not passive, and that in Wordsworth's words, one felt "a Presence that disturbs me with the joy of elevated thoughts." Of course, one realizes that there are degrees of intuition rising from a simple sense perception to ecstasy; but one's point is that, assuming the conditions of life are normal or natural, all grades of feeling for Nature are universal though often inarticulate. I would go farther and say that intuition is not independent of mental development, culture or discipline. The full appreciation of Nature is not for every man. Personally, one has long enjoyed the wonders of Nature, finding companions in every bee, flower, and pebble, nor has every stream or tuft of heather failed to present a fairy tale of which one could read and decipher perhaps a line or two. The child may not see the fuller meaning of things as apparent in later years, but in this matter the child portrays in brief the stages through which the human race has passed in its upward progress. The child may lack the delicacy of æsthetic discrimination, but its imagination is active and powerful. So, too,

we may safely assert that for the race, as for the individual, the modes of cosmic emotion grow fuller and richer in the course of ages. Man, be he what he may be, is instinctively a student of Nature and no slave to erudition but, as an alert and eager absorber of things new and old according to his abilities and opportunities, he looks to Nature for some of his joys and fruitful lessons; he sees in the outward shows of earth and sky manifestations of a Reality which rarely fails to commune with him, and in this manner Nature is for us all a means of both development and discipline.

One has laid stress on intuition, interpreting it as direct insight quite independent of reasoning processes and conceptual constructions. It follows that one accepts no symbolism in Nature as its prompter. As one sits on the bank of a mill stream and listens to the croon of the water wheel, one feels that life is there and wants the secret of the wheel itself, not what the wheel suggests. So when one walks the fields and feels oppressed with an innate feeling that all one sees has a meaning, if one could but understand it, one regards those objects not as substitutes for something else not really present, but things that have a being and a meaning in their own right, and that they are akin to the soul of Man. The idea is well expressed by Emerson, who says:—

“Spirit that lurks each form within  
Beckons to spirit of its kin;  
Self-kindled every atom glows,  
And hints the future which it owes.”

## II.

The sceptic may say this communion with Nature is mere emotion and its results have no subjective character, or that the results evaporate with the mood which brought them into being. He is tempted to say that modern sympathy with Nature is æsthetic feeling which has broken away from the fetters of mythological thought. This argument is worthy of consideration. Not long ago I had the opportunity of seeing a sunrise in association with some of the highest Himalayan peaks, and a profound impression was made upon me. The same or very similar phenomenon must have been seen by men thousands of years ago. Am I to assume that their interpretation of it was very different to my own? So far as astronomical inferences are concerned, yes; because modern knowledge has advanced me to a freedom which they had not attained. In respect of æsthetic inferences, the difference between

those earlier observers and myself is possibly but one of degree. The same objective facts were before them as before me. As knowledge grows interpretations become more adequate to the objective facts, but it does not deny them. The æsthetic feeling for Nature in me or other moderns is the direct descendant of the mythological form of the feeling for Nature which was present to the ancient. Such continuity could be secured only on some basis in the world of fact. That basis is the circumstance that Man is related to all below and all above him by ties which permeate his whole being. We can no more think of man's emotions, thoughts and feelings being isolated from his physical environment than we can think of his relation to that physical environment to be external in its physical aspects. There must be correspondence between cause and effect, and when certain moods are stimulated by certain physical phenomena there must be some kind of real causation. Any or every scene cannot harmonize with or foster any or every mood; neither is the mood wholly a subjective creation, nor is the object which stimulates the mood without quality or power corresponding to or essentially connected with the mood. There is a blending of elements which suggests that Man and Nature share a common spirit. Even cold science postulates a vital relationship between man's inner nature and the inner nature of his material environment, and assumes the behaviour of external objects to be in harmony with the workings of human reason.

It happens that one is writing this at a time just following the completion of an unedifying journey across the Punjab plains in June. As one recalls the incidents and aspects of that journey, one is tempted to say there is nothing human in Nature. One thinks of the parched earth and feels that it would let me perish on the ground and bring forth neither food nor water; one recalls the brazen scorching sun that merely burnt on and made no effort to assist me; the trees cared nothing for me; and even the distant sea, could I have reached it, would have offered me but salt water which I could not drink. It is a plausible argument, but maturer reflection tells me that therein lies a fallacy, in that it is too much from the standpoint of the individual human being. As a man, I am a centre of self-consciousness; my wants, pains, fears and pleasures are particular. I am forgetting that the infra-human objects in Nature have not attained to my particular mode of consciousness. Because a tree, a hill or a wave does not enter into personal relations with me or with one another, it is not for me to deny that they may possess a consciousness which, though different from mine, is yet

akin and linked to it. The fault lies rather with myself, in that I am or was oppressed with a feeling that Nature was remote and that I was not in a condition to understand her well enough. There was beauty, goodness and reason in all those apparently harsh aspects of Nature, though I could not comprehend them. Though incomprehensible in that garb, Nature was not and is not necessarily alien to me and to other men. Neither I nor anyone else should regard Nature as a mere æolian harp re-echoing tones emitted by the human mind ; she is but an indispensable agent in their reproduction, and the action is reciprocal.

### III.

If one's argument has been understood, the reader appreciates the fact that external objects, by sensation, obtain admission into our minds and become a part of it, as experience. Reflective thought works on this material and weaves portions into what we call knowledge. Much, however, never passes into clear consciousness ; it is felt rather than known, some is not even felt, though it influences our minds. This is intuition, and presents or contains what thought and reason try to make clear. One takes the position that the human mind and the external world are of the same stuff, or mind is invisible Nature and that Nature is visible mind. From this, Nature is but a manifestation of the same mental factors which we realize when we analyse our inner experience, and Man and Nature are manifestations of the same Reality. At the very dawn of reflective thought, the conviction of the essential sameness of all existence dominated man's speculations. We find it running through the Greek philosophies, culminating in Plato's doctrine of ideas in which Reality is but a system of thoughts called ideas, and the world of objects obtaining its reality by sharing in them or by copying them. Our senses cling merely to the copies, but the mind apprehends the true reality by general ideas. These ideas are no mere products of the mind but real existences ; in fact, so real that without them there would be no objects at all. In this manner, there is in each object an immanent idea which presents itself to our conscious thought as an objective manifestation of the Real.

In handling the term "idea" in this way, one regards it as embracing psychic existence in its entirety, that is feeling, will and reason. How many of us can truthfully deny within ourselves an identity between ourselves subjectively and Nature objectively, or of the realization of a Presence ? Probably none, and yet neither

Science nor Reasoning can give us an explanation. It is difficult to explain, but the position or conception may be more apparent if we say that the nature of a thing in itself would ever be a secret to us were we not able to approach it, not by knowledge of external phenomena, but by inner experience. It is entirely by our own self-consciousness that we can approach Nature. Communion with Nature, though it rest on passive intuition, must be associated with consciousness; that is Nature's self-activity is analogous to but not identical with our own. Our normal waking consciousness is but a special type of consciousness; all about it, parted by the filmiest of screens, lie potential but different forms of consciousness. Many of us go through life without suspecting their existence, but, supply the requisite stimulus and at once they are there in their completeness. No conception of the universe in its totality can be final which ignores these other forms of consciousness. One may say there is an uncommunicative Nature, or a Nature where psychic processes are not attuned sufficiently to ours for us to appreciate their vibratory messages, but we have no right to speak of a really unconscious Nature. Nature being then but a vast conscious process, evolution becomes but a series of processes suggesting to us degrees and types of conscious processes. From this point of view, the human mind is nothing but the highest development on our earth of the mental processes which animate and move all Nature. As one sits out in the still night and looks at the stars above, one regards them as no mere physical atoms in an incomprehensible universe, but one greets them, shining in their own right, as members with ourselves of a living cosmos. The idea is no new one, for Wordsworth says, "And 'tis my faith that every flower enjoys the air it breathes," while, Emerson echoes the same by saying, "The sun himself shines heartily and shares the joy he brings."

#### IV.

So far, one has attempted to enunciate the fundamental postulates and principles underlying a close relationship between Man and Nature. One desires now to review briefly the details as they have impressed one in reflective moments, and as one finds them evidenced in the records of Man's mentality. In so doing, one disclaims any arrogation to oneself of inner experience seemingly denied to others. They are not denied, for all normal members of our race share in varying degrees the faculty of intuition and

communion with Nature. The moulding force of the immanent idea and inner life of things is for all mankind, and for certain peoples is continuous and cumulative. One finds evidence of this in the characteristics of the great religions. The Greeks of classical times, living in an equable and soft climate, developed their soul-life in an environment of light, colour and warmth. Recall their word pictures of Apollo, of Athene, or of Aphrodite; throughout, we see an evolution of brightness, disciplined thought, philosophy, proportional art and spiritual aspiration. Think of the hardy Norsemen and Teutons. These were men nurtured under stormy skies and ever striving against the hardships of long and rigorous winters. No wonder they filled their heaven with titanic conflicts of the gods, and emphasized it with the rioting of feasting or the wild whirl of hunting. Throughout, we see their lives and religion free and fierce, but tinged with a tone of melancholy, Look at the nomads of the desert, swallowed up in vastnesses familiar with the impressive silences of time and space, and ever under a brazen vault and envisaged by a thirsty land. To them, in such an environment, the premonition of a spiritual unity of existence found an ideal encouragement. Pass to India and the Aryan race; to them the development of the Vedic god of fire was a natural corollary to their associated surroundings or, as Max Müller says, man being what he was could not help thinking, saying, and seeing what he saw. All these are simple instances of the broad principle that external Nature has ever exercised a definite and continuous effect upon the development of man's ideas, impulses and conduct.

## V.

Of all the phenomena of Nature, water, air and fire have always held foremost place in the attention of man. Though not the first to note the idea, Thales was the first to gather together into a definite theory the vague intuitions which, for ages, had been operative and indicative of the idea that water was the elemental world-stuff. It is true his speculations were crude, but we cannot deny to him both acuteness and originality. That old-world thinker saw in the mobility, volatility and changeability of water the clue to the flow of the whole cosmic process. Though Thales did not separate moving water from the moving force, he regarded water and life as inseparable, and that not only was moisture essential to germination and development but that, by virtue of water, all matter had plastic life. Throughout the ages, moving water has

ever had the power of stimulating man's emotion and prompting intuition. This is particularly the case when the source from which water issues and the goal to which it flows is unknown, as in the case of subterranean water. Even in modern times, we find Coleridge voicing the idea, in the fragment "Kubla Khan," in which from a deep chasm the sacred river Alph throws up a mighty fountain and, wandering for a space through wood and dale, plunges into measureless caverns to sink in tumult to a lifeless ocean. He says, "And 'mid this tumult Kubla heard from far ancestral voices prophesying war."

In mythology, water, especially that of the underworld, plays a big part and nowhere more so than in the Graeco-Roman conceptions of Hades. We recall the words which Homer makes Circe say to Odysseus, "But go thyself to the dank house of Hades. Thereby, into Acheron flow Pyriphlegethon and Cocytus, a branch of the water of Styx, and there is a rock and the meeting of the two roaring waters." No difficulty to see in this the prototype of the swamps and dismal streams of Virgil's Hades, nor of the mystical meaning to be read into the subterranean waters of the Greek mysteries and of the Phaedo myth of Plato. The mystic meaning of the underworld waters is even more exaggerated in the Teutonic myths. In them, under the forms of subterranean fountains that well forth physical, spiritual and æsthetic life, is mirrored the life of the universe which wells from unknown depths only to return to the deeps from which it emanated. Those myths are expressions of primitive intuitions embodied to form a primitive philosophy of life. The gap between this idea of a circulation of the waters and the notions of Thales is not wide. Both to him and to the Teuton child of Nature, the substance of the universe is living movement. It is difficult to avoid seeing in these historical records a complement to present day ideas and subjective experiences which testify how subterranean waters, flowing from an unknown source and falling into an unknown abyss, convey a sense of the limits of the knowable, combined with a sense of inexhaustible power. Carry the thought to the whirling electron of modern science, and is the analogy not recognizable? In them all, the beyond is vague and unsubstantial, but it breathes life and purpose.

Setting aside all ideas of Naiads and the water-sprites of classical mythology, if we think of springs and wells, who of us can fail to remember familiar associations between these natural and common objects and sentimental beliefs? In Eastern lands, where the sources of water are rare and distant from one another,

these centres of Nature's bounty present a rich store of family and tribal legend. Further, the intuitions they prompted are peculiarly transparent and spiritual. Under Oriental conditions, the water is literally "life," and as the conception of life deepened, so did intuition become more delicate. No matter where we look, be it from the earliest ages to the present time, the continuity of the feeling that in the phenomena of water gushing from a source there is a manifestation of self-activity, mysterious power and spontaneous life, is not only definite, but has wielded and still wields an influence over man. Our poets are full of sweet allusions to the running waters and all they convey to man. In modern garb, they voice merely the philosophy of early man. Are we wiser now? Is our glib talk of liquids in unstable equilibrium, following lines of least resistance, any nearer the discovery of the secret of water movement in brook and stream than primitive man's view of water-spirits, "that are as souls which cause the water's rush and rest, its kindness and its cruelty"? It is rash to answer yea or nay. One prefers to let "the well" speak in Brown's poetic words:—

"I am a spring—  
Why square me with a kerb?  
O cruel force, that gives me not a chance  
To fill my natural course;  
With mathematical rod, economizing God;  
Calling me to pre-ordered circumstance  
Nor suffering me to dance  
Over the pleasant gravel,  
With music solacing my travel."

## VI.

All the mystic influences of moving water are emphasized by rivers. Think of all that has been associated, by the peoples who have dwelt on their banks, with those historic rivers, the Nile and the Ganges. To the Egyptian the Nile was the sacred river, one of the primitive essences, and ranking with those highest deities who were not visible objects of adoration. Its phenomena left distinctive features on his religion. That religion was one of contrasts, representing the world as a scene of titanic conflict between the creative power of Osiris and the destructive influence of Typhon. The master influence was the Nile. On one side barren rocks and parched sands, and on the other the fertilizing power of the sacred stream. All around, vast solitudes, and along the river the hum of teeming cities and the rich fullness of



prosperity. Secondary to these influences, on the religion of the Egyptians, from the Nile was the fact that from the river the Egyptian grasped and developed the doctrine of immortality. The ever renewed gift of life which the Nile brought from an unknown and unseen world was the germ of the conception of Osiris as the god of the resurrection. We know how the Egyptians influenced thought among the Hebrews, the Greeks and the Romans, and how these again have influenced ourselves and others. The effect on the human mind of the physical phenomena of this single river is hard to estimate.

If we turn to India, we find the story of the Ganges and its mystical concept of purification. This clearly was suggested by the cleansing qualities of water, and has exercised a profound function in the development of spiritual ideas throughout India. Of course, we have the same idea in the case of Christian baptism, supplemented by the new birth and the higher life of the spirit. Apart from this, all the larger rivers of India are identified with the abodes and vehicles of the Divine essence, and therefore possessed of power to cleanse from moral guilt. Probably, in no land on the face of the earth has the river obtained a greater hold upon the affections and imaginations of the people than in India. Generation after generation, in all parts of the world, has responded to the influence of rivers and found them capable of stirring peculiarly the emotions, and of stimulating profound thoughts on the mystery of life. We are forced to recognize that all rivers have had, and still have, a big part to play in the cosmic drama and in the development of man's nature.

Moving water, it has been shown, is suggestive of life ; curiously enough, we find in it a suggestion of death. Its most elaborate example is in the ancient myths of the nether regions, and of how, from the seven streams that watered them, Lethe, the river of oblivion, runs. This sombre train of reflection is recognizable in and deducible from the old adage, "Follow the river and you will come to the sea." Old age and death cannot fail to assert themselves in the minds of those who sail down some large river. As the banks fade dimmer away and the breeze brings murmurs and scents of the infinite sea into which a river ends, we get the suggestion of the close of life as we know it here, but coupled with the intuition that the substance remains diffused in a vaster whole, but not lost. With such an insight, consistent with the conservation of energy or of values, man reads into the phenomena of a river flowing into the sea the concept of a transition only,

not of an abiding state, and thinks to himself, surely we die to live more fully. Morris puts it well when he says: "As the stream flowed it will flow: though 'tis sweet, yet the sea will be bitter; foul it with filth, yet the deltas grow green and the ocean is clear."

## VII.

As we stand on the seashore or on the decks of a ship and regard the ocean, it is difficult to escape the feeling of a community between it, ourselves and our lives. We see the ocean before us, infinitely varied and yet unchanging, gentle yet terrible, radiant yet awful. There is not a mood of ours with which it cannot link itself, nor a problem to which it cannot hint a solution. The simplest intuition from the ocean is that of a beginning and an end. We think, with Tennyson, of the time "When that, which drew from out the boundless deep, turns again home." Or, we recall the words of Milton, who said aptly of the ocean, "The womb of Nature and perhaps her grave." These are poetic phrasings, but they convey the meaning of thoughts within us all. Apart from this aspect, the ocean compels us with a sense of our own helplessness and its own power and majesty, and again at times it stimulates moods of sadness, or even of exhilaration.

This sense of exhilaration is peculiarly associated with the sight of waves. Some reader may recall his readings of Æschylus in boyhood, and remember how Prometheus, looking from his Caucasian rock, appeals to primeval Nature and says: "Ether of heaven and winds untired of wing, rivers whose fountains fail not, and thou sea laughing in waves innumerable." The ideas immanent in ocean waves are as varied as the human experiences to which they are akin. No one who has sat on a deserted shore can fail to have been affected by the spell of the waves. Whether it is the tiny ripple, or the merry rustling crested surf, or the storm billow, in each and all one finds intuitions, suggestions and spells difficult to analyse, but which hold our gaze and impel us to ponder. It is not only the might and infiniteness suggested by the wave which affects us to sadness or serious thought, but we feel the loveliness of the wave. Think of the fine myths of Poseidon, his sea horses and his bands of Tritons, Nereids and Oceanids; they are full of vague intuitions and give substance to subconscious perceptions of the ocean's beauty. In the present day, one needs no imaginary personifications such as those to bring us into communion with the wave. It is hard to define one's modes of experience, but the

most commonplace of men cannot at one time or other have failed to respond to the calls which from the waves speak to him in language too plain to be ignored or misinterpreted. I write this, having been at a ball overnight, and recall the fact that, as one watched the dancers and noted some specially charming maid, the thought was irrepressible of Shakespeare's words, "When you so dance, I wish you a wave o' the sea, that you might ever do nothing but that." Its fittingness here is too obvious and tempting to leave unrecorded. And thus the mountain tarn, the bubbling spring, the river reach, the placid lake, the still deep pool, and the boundless sea have each and all their soul language, and man finds himself a sharer of joys, sorrows, hopes, fears and regrets with those aspects of Nature.

#### VIII.

One has so far dwelt on intuitions from water; but there are other aspects of Nature, such as winds, storms and clouds, equally pregnant with ideas. What Thales saw in the motion of water, so Anaximenes of Miletus in ancient days saw in air the clue to the world-substance and the universal vehicle of vital and psychic force. One may quote one of his dicta: "As our soul, which is air, holds us together, so wind and air encompasses the whole world." He taught that the simple world-substance was air, that rarefied it became fire, and in its condensed state it progressed from liquid to solid. These notions seem crude to us, but, odd as they are, we find that his insistence on the primal function of air in the cosmos runs through a widespread group of animistic conceptions, and survives to our time. A perusal of Max Müller's fascinating books throws an interesting side-light on the question. Take such words as *ruach* and *neshamah* in Hebrew, or *nefs* and *ruh* in Arabic, or *atman* and *prana* in Sanskrit, or *psyche* and *pneuma* in Greek, or *anima* and *spiritus* in Latin, or *duch* and *duk* in the Teuto-Slavonic dialects, or *geist* in German, or *ghost* in English, and we find how the Jew, the Arab, the Brahmin, the Greek, the Roman, the Slav, the German, and the Englishman each use words which mean that the soul or spirit is synonymous with the air or breath, as being the least material image of the soul which they can conceive. It would seem that man's fleeting breath fostered the idea of immortality, and the wind that bloweth where it listeth was the idea of a realm of changeless spirit.

From air we pass to winds and cloud, and Pope's well-known lines, "Lo, the poor Indian, whose untutored mind sees God in

clouds or hears Him in the wind," express a multitude of possibilities. The old Red Indian of America had a vigorous and beautiful myth of the four winds, as we know from "*Hiawatha*"; while our own Bible is full of word-pictures of the winds as intermediaries between man and his Creator. Speaking for myself, I know of nothing more awe-inspiring than to be unsheltered and at the mercy of a high wind. The winds were bound to make indelible impressions on the primitive mind, hence wind gods are of world-wide diffusion. Those of the Greeks and Romans are best known, but the *Māruts* of the Vedas and Odin and Wodin of the Teutonic myths, to say nothing of Jehovah of the Hebrews, all betray a continuity of the intuition. Even we, in this day, are emotionally responsive to the winds: they sob, they sigh, they moan, roar, rush or bellow; they exhilarate or depress and raise a varied train of thought; and most of us, in spite of our modernity, have glimpses of "heaven's cherubims, horsed upon the sightless couriers of the air."

The clouds are not less genuine echoes of primitive feelings. Sitting one evening on Pabbi platform waiting for an Indian train, and gazing at a gross mass of storm clouds over the Ambeyla and Malakand heights, it was impossible to suppress ideas of vagueness, unsubstantiality, ever-changing pageantry and dreams of majesty, or glorious possibility in association with those cloud masses. They were just the kind of cloud-scape which one can think must have influenced Shelley, when he wrote: "Like mountain over mountain huddled, but growing and moving upwards in a crowd." Again, often and often have I watched a cloud form as if a nursling of the sky, then break into rain and be no more. The whole sequence of phenomena was pregnant with the conceptions of mutability, and yet of continuity. So much so that one can imagine the cloud saying, as Shelley puts it: "I silently laugh at my own cenotaph, and out of the caverns of rain, like a child from the womb, like a ghost from the tomb, I arise and unbuild it again." The honest reader will readily confirm these experiences, and agree with Keble in saying that "The clouds that wrap the setting sun . . . seem they the breath of life to breathe"; or, if more solitarily inclined, re-echo Wordsworth's words, "I wandered lonely as a cloud that floats on high o'er vales and hills." Thinking of cloudland, can one forget the bow in the cloud? No, it has been too great a symbol and an influence in the past; it is still in spite of our spectro-analysis of its nature. We see in it now a harbinger of better things to come, and still a bridge from

this "solid-seeming earth to a rarer land beyond." Even the most prosaic of us have a latent sympathy, which carries us back to childhood, with the mystic sevenfold bridge. So let it be.

## IX.

The conception of a cosmic fire we owe to Heracleitus, who saw in it movement or the secret of the eternal change which characterizes all known phenomena. He regarded the soul as fire dependent on the cosmic fire for sustenance, the breath being the physical medium; he held also that sense perception was another medium, by this means the outer fire being absorbed by the inner fire. That a flame—dancing, flickering, flashing, appearing and disappearing, unsubstantial yet curiously potent—should early attract thinking man is not surprising. Heracleitus was an acute observer, and he saw in the flame of a lamp the appearance of a thing of form, existence, and yet never the same. He read into it motion, and when that motion ceased the flame went out with smoke, or an apparent return of volatile matter to solid form. It is difficult to deny to this old-world thinker's speculations a curious harmony with our modern, advanced theories. To primitive man, less endowed with brains than Heracleitus was, fire was a standing miracle—at once destructive and life-giving, material yet immaterial, and clearly of divine origin. A varied series of legends, belonging to many ages and climes, ring the changes on these fundamental ideas, and these emotional attitudes to fire led to its domestic use and the vesting in the domestic hearth an unmistakable religious aspect. The Greek Hestia and the Latin Vesta were goddesses personifying fire and guardians of the household altar-hearth. At Delphi was the oracle and the communal hearth. In India the fire-god Agni really means the "Mover," possibly from the leaping movements of a flame. Hephaestus of the Greeks and Vulcan of the Romans, were also fire-gods; and it is noteworthy that both Hephaestus and Agni were patrons of wedlock, associating fire with the life-giving forces of Nature. Out of these ancient myths or beliefs grew up the later conceptions of hell and purgatory, which find expression not only in theology, but in words for some of Milton's finest lines.

From veneration of, and the association of æsthetic and ethical ideas with fire it is but a step to the conception of sun-gods. These we find exemplified in Ra of the Egyptians, Apollo of the Greeks, and the various gods to be found in old Persian, Peruvian and modern Parsee literature; even our own Shelley says of Apollo, "I am the

eye with which the universe beholds itself and knows itself divine." Some of the finest conceptual intuitions of the sun are identified with the effect of light upon man. In the Babylonian cosmology we read of Marduk, the god of light, with Tiamat as his antithesis. The deadly contest between Light and Darkness is traceable through all ages and among all peoples, typifying the conflict between good and evil. Behind these two great cosmic facts of Light and Darkness lie vague intuitions. The physical effects merge insensibly into the æsthetic, the moral, and the spiritual. Throughout we are conscious of the emotional effects of fear, horror and negation suggested by darkness; while joy, energy, beauty and purity are intuitions from light. Modern science does not break the continuity so far as light is concerned, for the phenomenon of light is linked with electricity, and electricity with life. Thus, at both the dawn and noon of human thought, light and life are dimly yet persistently felt to be of kin, if not identical.

- X.

And what about "That orb'd maiden, with white fire laden, whom mortals call the moon"? No object in the sky has given greater sense of kinship with man than the moon. Apart from her function as a lighter of the night, many worldly happenings are dependent on her motion and position. She affects our tides and, as Wordsworth puts it: "Through the cottage lattice softly peeping, dost shield from harm the humblest of the sleeping." Think of the rising moon, which seems as if she were looking for us; and we cannot but wonder how often she will wax and wane and still look for us, but one day look in vain. Who among us is not familiar with the maiden's face in the moon, and has not fancifully brought her to earth to sit beside us? I confess I often have, and even felt a real companionship when sitting out at night, looking at the cold, calm wanderer of the silent sky. In such mood, one sees in her a desire of the night for the morrow, and a devotion to something far away. Again, think of the harvest moon and all it means. Who can fail to see in her a mild herald of plenty, and greet her beams as those of a queen of mountains, forest and glen? I fancy few, and that all of us can say, with Clough, "Thou rollest, stayest not, lookest onward, look'st before, yet I follow evermore."

The stars, perhaps, least of all appeal to man. They are too remote, and yet somehow very near. But even they start trains of passive contemplation, thought, and, not infrequently, stimulate

active emotions, with a passionate yearning to know the unknowable. Sitting out at night under a cloudless sky, one has often been struck by the thought that at no other time is Nature more aloof from Man. This feeling of aloofness is peculiarly associated with the stars; it is not a constant nor perhaps a normal feeling, for, whether in its friendly or its alien aspects, the all-embracing sky affects one. Nowhere more so than in flat or desert regions. In India it has played a great part in fostering abstract universalism, and tempted Man to views which are hostile to human initiative, or to a belief in objective reality. This is an extreme position, and finds an easy corrective in the sense of harmony, unity, and an all-embracing deity which the universal span of the sky gives; perhaps nowhere better expressed than by Keble, who wrote, "The glorious sky, embracing all, is like the Maker's love."

## XI.

If any reader has put in a summer at Chirat, or even wandered through the valleys of the Gomal or the Tochi, he will understand that direct form of Nature feeling which prompted originally this article, and appreciate the mystic sense which Shelley implies so well in his lines: "Eagle-baffling mountains, black, wintry, dead, unmeasured, without herb, insect, or beast, or shape, or sound of life." This allusion to the effect of inhospitable regions is but typical of the theme upon which one has dwelt and, more especially, emphasizes how a solitary place turns the human mind or spirit inwards or upon itself. It does more; those craggy slopes of naked rock or sun-baked loam, by their very grotesqueness of contour, raise often whimsical fancies of men and animals. One is unaware of any literary recognition of this comic side of Nature, but it is there and suggests the question whether it is something peculiar to Man, or whether it has a place of its own in the Universe. To me, the comic seems hardly so legitimate evidence in support of a kinship between Man and Nature, as are the æsthetic and more spiritual intuitions; but, for all that, it is occasionally present. The comic side of Nature is probably purely subjective and concerns only Man himself, by virtue of certain external phenomena reflecting his affairs. One cannot admit it to have a place of its own in the universe as a whole.

One has said nothing of the trees, yet they are a part of Nature and have their emotional and mystic setting. Since immemorial time, the tree has been the emblem of life. If trees do not talk,

they certainly manage to supply a good substitute for speech. Trees are not only alive, but they have character and individuality. I recall a fine old elm at home: often have I laid beneath its shade and felt "the soft-eyed music of slow-waving boughs," and its branches wrestling with their inmost stalwartness giving, as it were, a virtue to me. That tree was a veritable friend to me in boyhood, ever dumbly eloquent, suggesting at once imperturbability, serenity in all weathers, innocence and yet a savagery. When at home, I never fail to visit that tree which still stands, a living link to me with pleasant childhood's hours. Similarly, I recall a group of pines near the seashore which, bent and bowed by the sea-blast, ever suggested women fleeing from the sea with their hair all loose. Locally, they were known as "the witches," showing that the least instructed of those parts felt the subconscious play of primitive intuitions arising from the life, shape and movement of those trees. In later life I came across the following lines which aptly explain not only one's earlier, but one's maturer feelings towards those objects of a familiar landscape:—

"Yon row of black and visionary pines  
By twilight glimpse discerned. Mark how they flee  
From the fierce sea-blast, all their tresses wild  
Streaming before them."

Those lines are no mere poetic imagery, but a word picture true, suggestive, and descriptive of Man in touch with the inner spirit or meaning of certain objects in Nature.

## XII.

The matter-of-fact reader may, perhaps, be tempted to dismiss all that one has written as so much dreaming. Before he does so, let him pause and think whether so hasty a judgment is not but a drawing of attention to his own limitations. The psychologist, with the experience of poet and musician to guide him, knows better and grasps fully the reality and significance of mysticism as a part of that experience on which Art and Religion depend for their inspiration. To the doctor, who is not a psychologist, the question is equally of importance. By him, particularly, should it be recognized that the scientific understanding is not the basis of our mental life; but, that this mental life rests upon those elemental value-judgments which Nature makes from the outset, long before consciousness supervenes upon the unconscious life of feeling. We are slowly being forced to adopt the old aphorism, "Omnia exeunt in



mysterium," for the very motive springs of our being lie deep-rooted in our subconscious personality, a region of darkness illumined only by the lightning flashes of intuition.

Not a few of the difficulties and prejudices associated with or suggested by this article will be removed by a right appreciation of what is called a myth. Unfortunately, the word has been degraded in meaning until it has come to signify an idle tale without truth in it. This is quite at variance with its true and real significance. The true function of myth is identical with that of poetry and music. It appeals from the world of the senses and scientific understanding, that is from the conscious plane, to that major part of man's nature which is not articulate and logical, but feels, wills, and acts, that is to the subconscious self. Its function is but the regulation of transcendental feeling for the service of conduct and science, enabling Man to view life "*sub specie aeternitatis*" in one stupendous vision. One may put it in another way, and say that reason is sometimes transcended by emotion and that the scientific understanding itself only functions, so to speak, on sufferance, through the tacit assumption of those very truths which are revealed subconsciously in myth.

One is constrained to enter into these arguments as, in the light of them, it is hoped that any false impressions raised by a casual perusal of these pages may be corrected. If it does nothing more, this article may direct attention and thought to a study of Nature, not only for herself but also for the sake of Man. It is in Nature and in her subtle but potent effects upon the human mind that lies at least one corrective or antidote for the stress and tension of modern life. One writes from personal experience of the ease and comfort which result from Nature contemplation, carried out as a form of mental discipline and education of powers of observation, but not as a cult. Convinced that Nature is spiritually akin to Man, the deduction follows that the proper study of mankind is human nature as part of a living whole; or, to alter slightly a well-worn tag from Terence, one concludes by saying, "*Homo sum, et mundani a me nil alienum puto.*"

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ACOMPARISON OF FOREIGN ARMY MEDICAL METHODS  
WITH THOSE OF THE BRITISH ARMY, WITH  
SPECIAL REFERENCE TO THE TERRITORIAL  
FORCE.<sup>1</sup>

By MAJOR C. E. POLLOCK.

*Royal Army Medical Corps.*

INTRODUCTION.

THE above title really embraces a wide field. In a single lecture it would not be possible to deal with details of all foreign armies, and it would not serve any useful purpose to do so. I therefore propose to take the Austro-Hungarian, the French, and German Armies as examples of continental organizations, and to limit myself to the general arrangements of the army medical services of those countries.

Before discussing the general organization of foreign army medical services, it is well just to recall to our minds what the functions of an army medical service are, for we must remember that, speaking generally, the medical service of every army has the same problems to face, and the same work to perform.

In early times armies had, according to our present standards, no army medical service. Disease was looked on as an act of God, as something which was to be expected and which must be borne, but which it was impossible to prevent. Therefore, a few physicians or apothecaries were appointed to cure sickness, and a careful commander might engage a leech or barber-surgeon for his unit. Sick and wounded were handed over to the civic authorities, or left in villages to die or get well if they could. Field hospitals were first employed early in the eighteenth century, but were very elementary formations compared to our present ideas.

Gradually, with the growth of our scientific knowledge as to the origin and spread of disease, it was recognized that the occurrence of disease might to a great extent be prevented; and that both from the point of view of the efficiency of the army, and also of saving expense, it is better to prevent disease than to cure it. Our methods of treatment also began to be based on the results

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<sup>1</sup> Address delivered to the Officers, 2nd London Division, Territorial Force, November 20, 1913.

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of scientific inquiry and experiment instead of on superstition and empiricism. As the result, this advance in knowledge has in every army brought about the gradual evolution of a corps of highly-trained officers and men with a somewhat intricate organization.

The functions of the medical service in every army may be broadly stated to be :—

- (1) The maintenance of a high state of health.
- (2) The prevention of disease.
- (3) The provision of the best possible treatment for men who fall sick or are injured (this includes, of course, wounded in war) while serving in the army.

The duties embraced under (1) and (2) may be regarded as regimental duties—that is to say, they are performed by the medical officers in charge of units under the direction of central expert authority. These duties include the examination of recruits, seeing the daily sick and disposing of them according to the nature of their disability, the supervision of food and water supplies, of clothing and bedding, of sanitation in barracks and camps, and of physical training.

The duties included under (3) may be regarded as medical unit duties, and embrace the provision of efficient treatment in properly constructed and equipped hospitals supplied with all the necessary special appliances and a trained staff. In war time there is in addition the problem of evacuating sick and wounded, together with the provision of the necessary treatment and hospital accommodation during the journey to the base.

Bearing in mind what the functions of an army medical service are, we may now pass on to discuss the different organizations which have been evolved to perform this work. The principal differences which exist in the different countries are due to the conditions of military service obtaining in each country.

#### PERSONNEL.

*Supply of Medical Officers.*—In the United Kingdom, as you know, military service is voluntary, and medical officers enter the army as fully qualified doctors; with a few exceptions, only the services of full-pay and half-pay medical officers of the Royal Army Medical Corps are available in time of peace, while the reserve for war is relatively small in numbers.

In continental armies many of the medical officers on the *active*

list receive their education at the expense of the Government, and in return have to undertake to serve for a certain period—usually eighteen months for each year of free instruction—in the active army. This arrangement not only enables a clever youth who may be poor to obtain a scientific training for nothing, but also ensures a supply of junior medical officers, for in all continental armies there is difficulty in keeping up the establishment of junior medical officers, while, as everywhere, seniors are too plentiful, and will not die or resign. Medical officers can also enter the army when fully qualified after completing their compulsory service, but experience has shown that many of these resign their commission during the first two or three years of service.

On the continent military service is compulsory for every able-bodied man. Medical men have to serve for a certain period, varying from six months to two years, according to the country to which they happen to belong. In Germany and Austria, and also to a certain extent in France, the first half of this service is passed in the ranks of a combatant unit to acquire drill and discipline; the second portion is taken after the student has received his qualification to practise medicine. During this time the medical man performs the same duty as a junior medical officer of the army, either with a combatant unit or in a military hospital; he receives no pay, has to find his own uniform, and has the position of a warrant officer. On completing this service to the satisfaction of his seniors and passing an examination in army medical subjects, he may elect to apply for a commission in the active army, in which case a ballot is taken of the regular officers under whom he has served. If he is accepted, he is sent to the army medical school for six months to study army medical subjects. Most of the one-year volunteer surgeons pass to the reserve as officers of the army medical service, and in this capacity have to attend two periods of further training, during the first three years in the reserve. This system has two advantages: it ensures an adequate supply of junior executive medical officers for duty in peace time without costing the State anything, and it automatically keeps the reserve up to full strength, thus providing personnel for medical duties on mobilization.

*Subordinate Medical Personnel.*—In our army we enlist men almost without exception direct into the Royal Army Medical Corps and train them for nine months, after which there are various special courses which a man can take out. In the French Army there are *Sections d'infirmiers militaires*, one for each division of the army, into which men may be enlisted direct or transferred

from other corps; direct enlistments are mostly men who are short-sighted, or for some reason not up to the physical standard required in combatant units. These army hospital companies are commanded by non-medical officers, corresponding to our former captains and lieutenants of orderlies; they are subordinate to the senior medical officer of the hospital or division. The *Sections d'infirmiers militaires* form part of the division to which they belong and are not a corps. They do not therefore correspond to our Royal Army Medical Corps.

In the German and Austrian Armies there is no corps of medical subordinates. The German Army has a body of men known as *Militär-Krankenwärter*, i.e., military sick attendants. They wear a special uniform, but are only enlisted on the establishment of a hospital and do not form a "corps" in our sense of the word. All of these men are artisans and do general duty and odd jobs, but do not nurse the sick. Men required to attend to the sick in hospital or for medical duties with combatant units are taken from the combatant units after completing one year's service; they are trained for three months and then sent to do duty and to complete their training under the medical officers in charge of units or hospitals. These men continue to wear the uniform of the unit from which they were taken, with the addition of the medical badge in yellow, the snake and rod of *Æsculapius* surrounded by a wreath.

Owing to short service and the way in which the medical orderlies are obtained in continental armies, there is not sufficient time to train dispensers. This want is filled by the appointment of pharmacists, who not only supervise the dispensing and quality of medicaments supplied, but also carry out all chemical examinations for the medical service; they also take charge of medical store depots.

#### DISTRIBUTION OF DUTIES.

*Regimental Service.*—In the British Army the medical officer in charge of a unit usually also has hospital duty to perform, and in fact, there is a tendency to look on the medical charge of a unit as a side issue. He is rarely in charge of the unit for any length of time, frequently only for a month or two, and as he is not commissioned to the unit he does not feel himself to be part and parcel of it. This does not apply to medical officers in charge of units of the Territorial Army. The main reason for these frequent changes is that, roughly, half of the British Army is permanently

serving abroad, so that half the army medical officers are also sent on foreign service for a tour lasting three or five years; these officers have to be relieved at the expiration of their tour of foreign service, and officers serving at home have to take their places. This necessitates frequent changes in the appointments held by medical officers. Again, our regiments serving at home change their garrison every two or three years, but the medical officer does not change with them.

Now, with the exception of the French Army, which has roughly two divisions of regular troops in Northern Africa, none of the continental armies have any foreign service, as this is carried out by their Colonial troops who have nothing to do with the regular army. Medical officers are gazetted to the charge of or for duty with combatant units and remain with them for years. The same applies to the principal medical officers of the Army Corps, and to the senior medical officers administering the medical services of divisions. When mobilization is ordered these medical officers mobilize with their units and have thus the advantage of knowing more or less intimately the officers and men with whom they are to proceed on active service. Medical officers doing duty with combatant units have nothing whatever to do with the garrison hospitals which are also quite independent of the P.M.O. of the division or army corps.

*Regimental Hospitals.*—In the British Army we have no regimental hospitals; men under treatment in barracks continue to live in their barrack-room and merely receive out-patient treatment.

In all continental armies there are regimental hospitals or sick-rooms in which men are commonly treated for periods up to a week. These establishments are really non-dieted hospitals, administered by the medical officer in charge of the unit who has one or two subordinates of the medical service to do the nursing in addition to the permanent regimental stretcher-bearers. Men are only sent to the garrison hospitals when they are likely to be ill for more than a week, or to require operative treatment.

The staff of the garrison hospitals in continental armies has nothing to do with the medical service in units. In the German Army each department of the garrison hospital is under the charge of a specialist medical officer who is assisted by a number of "one-year volunteer" surgeons, as medical men are termed while doing the second portion of their compulsory service.

To become a specialist in the German Army medical service, an officer must have served for at least three years with a unit;

he then has to submit an application for special study leave, together with an essay on some original work to show his proficiency in the subject selected. If his request is granted he is sent to one of the university clinics to work under the professor in charge for two years. At the end of this time, if favourably reported on, he returns to army duty as a specialist. In exceptional cases he may be retained as an extra professor of the university for further periods up to ten years, when he must either return to duty or retire from the army; if he elects to retire he still remains liable to recall in case of mobilization as a consulting specialist.

The garrison hospitals in Germany are not under the control of the P.M.O. of the division or army corps; they are under the supervision of the inspector of medical services of the group of army corps to which they belong.

The above notes give some idea of the working of the medical services in peace, especially where the continental methods differ from our own.

We now pass on to the general organization for war.

#### ORGANIZATION FOR WAR.

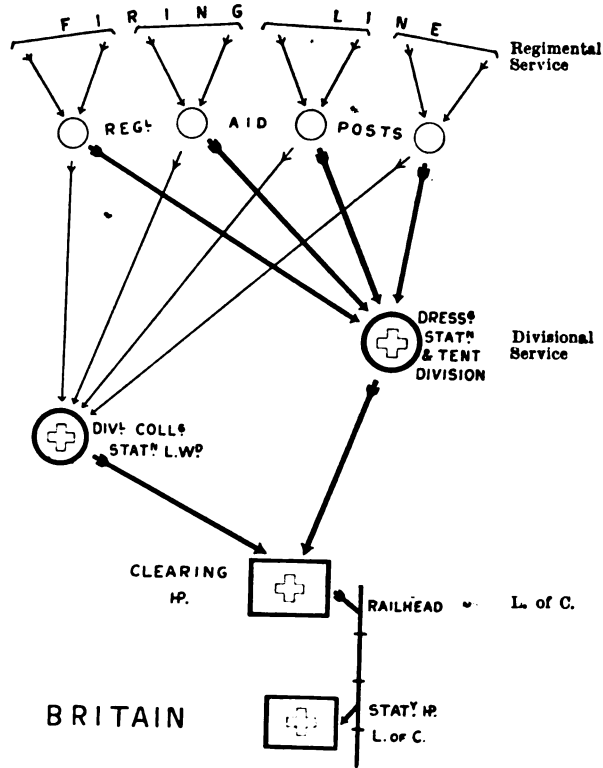
In all countries when mobilization takes place the combatant units are already in existence and have been practising the duties which they will be called on to perform in war. On account of the prohibitive expense no country thinks it could afford to maintain its field medical units in time of peace, and they only come into existence for the first time after mobilization has been ordered. The Territorial Force does not suffer from this disadvantage as its field medical units exist as such in peace time. The field medical units of our regular army are brought up to war strength by employing reservists and special reservists. The continental armies, thanks to universal service, have a large reserve of medical personnel.

In the British war organization the regimental unit is the battalion and the field army unit of all arms is the division, consequently our regimental medical service is based on the charge of a battalion of infantry (or corresponding unit of other arms of the service), and our medical units are divisional ones.

In continental armies the corresponding army units are the regiment, consisting of three or four battalions in the case of infantry, while the medical units are army corps or army ones, but may be temporarily lent to divisions.

*Regimental Medical Service.*—In the British Army we have

a very limited medical personnel with each battalion and a number of very fully equipped divisional medical units in support. The very limited regimental medical personnel is a continuance of our policy in peace time, while the heavily equipped field ambulances and clearing hospitals are the result of our numerous wars in uncivilized countries where nothing can be procured locally and everything has to be dragged along with the army.



In the organization of continental armies the principle adopted is to have a strong regimental medical personnel with a number of field medical units, having a full medical staff but only light equipment, ready to come up to the support of the regimental medical service when required. Continental armies are organized for European warfare where buildings and articles for household use can be requisitioned locally, hence the medical units carry few or no tents, very few cooking and ward utensils, and no furniture, as these



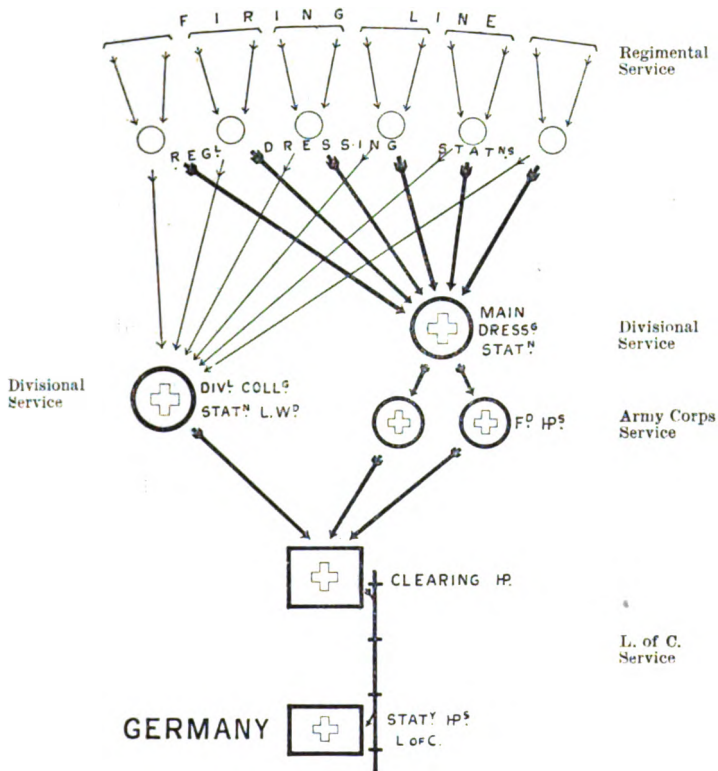
articles are to be found in every locality. Each unit is well supplied with dressings and food and has a wheeled kitchen.

In one other respect the field medical organization of continental armies differs from that of the British and that is in the employment of organized voluntary aid on the line of communication, which is always in the home territory or a direct continuation from the home territory. In our case we trust the line of communication will always be an overseas one, hence the employment of voluntary aid would raise many difficult questions. Voluntary Aid Societies, before being registered as such and receiving the privileges accorded to these societies, have to sign an undertaking to conform to the Government requirements. In Germany, one of these is that at least one half of the active members must take an obligation to serve for at least three months, if called on to do so, either in their own homes or on the line of communication. Voluntary aid personnel is used to supplement the regular army personnel in clearing and stationary hospitals, to take charge of convoys of wounded proceeding by road, to take charge of ambulance trains, to establish road and railway rest stations, and for work in hospitals in the home territory. While so employed the personnel is under military law and receives the same pay and privileges as regards travelling, wound pensions, treatment in hospital if sick, &c., as the corresponding ranks of the regular army medical service. Voluntary Aid Societies also have a number of completely staffed and equipped hospitals and convalescent homes in the home territory.

*On the March.*—In the French Army a certain number of ambulance wagons are detached from the bearer company, generally one to each regiment of three battalions, to pick up stragglers and take them along to the next halting place, at each of which the regimental medical service opens a temporary hospital (*point de recueil*). In the Austrian Army the daily sick are handed over to the divisional medical unit for disposal. At intervals of every three marches a rest station is established by the personnel of the reserve medical unit. In this station slight cases of disability are treated and then sent back to their units. Patients unable to travel are treated until able to do so; the remainder requiring hospital treatment are sent back to the nearest military hospital.

In the German Army one combatant unit is ordered to furnish a detachment from its regimental medical establishment to receive the daily sick of the division; these, if requiring hospital treatment are sent, usually by requisitioned transport, to the nearest temporary or

permanent line of communication hospital, after which the detachment has to rejoin its unit. This does not appear to be a very satisfactory arrangement. Owing to the recent adoption of motor transport, fresh arrangements will probably be made for the collection and disposal of the daily sick.



### THE COLLECTION OF AND DISPOSAL OF WOUNDED AFTER A BATTLE.

#### *German Army.*

Each battalion of infantry has 2 medical officers, 4 N.C.Os. (1 per company) of the medical service and 16 permanent stretcher-bearers. In our army we have nothing to correspond to these stretcher-bearers, who perform purely medical duties, wear the Red Cross brassard and act as assistants to the medical officers when seeing the daily sick or dressing wounded during an action.

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Our stretcher-bearers are permanently employed as such in war time, but otherwise they correspond to auxiliary stretcher-bearers in the German Army. There is no fixed establishment of auxiliary bearers in the German Army; they fight with their unit and are ordered to fall out to carry wounded by the Commanding Officer of the regiment; they wear a red arm band, and are not protected by the Geneva Convention. When a battalion goes into action half the regimental medical personnel remains in the fighting line to give first aid to the wounded; the other half prepares to form a battalion or regimental dressing station, under the orders of the senior medical officer of the regiment. This station is opened by order of the officer commanding the regiment, i.e., a brigade in our sense of the word, at the nearest suitable spot under cover. This post corresponds to our advanced dressing station. The principle observed is to pitch as few of these regimental dressing stations as possible, and not more than one for each regiment. The medical equipment of the unit is used in establishing this post.

Men who are wounded in the fighting line are attended to by the medical personnel there, and as opportunity offers sent on to the regimental dressing station, where the dressings are examined, and if necessary reapplied; only the most urgent surgical operations are performed at this post, e.g., tracheotomy or ligature of an artery, if this cannot be postponed till the man reaches the main dressing station. One important function of this regimental dressing station is the classification of wounded according to the severity of the disability. Men only slightly wounded are formed into squads under the command of the senior soldier or N.C.O., and directed to the divisional collecting station; men requiring hospital treatment are taken over by the bearer company and sent or carried by hand or in ambulance wagons to the main dressing station.

*The Bearer Company.*—This consists of a medical section and two bearer sections; it has 5 wagons for medical and surgical equipment, and 8 ambulance wagons. The medical section has 8 medical officers and 17 medical subordinates. Its duty is to establish the main dressing station. The bearer sections have together 242 N.C.Os. and men of the medical service and 34 N.C.Os. and men of the transport corps. The sections are commanded by non-medical officers, they assist in establishing the main dressing station, and then undertake the removal of wounded from the regimental dressing station to the main dressing station,

and, if necessary, may assist in transferring them to the field hospital. When sufficient buildings are not available to accommodate all the wounded, tents are constructed with the shelter tents carried by the men.

When the main dressing station can be established fairly close to the fighting line the regimental dressing stations are closed and their personnel is used to reinforce that of the main dressing station. The main dressing station is ordered to open in 13 sub-sections, viz. :—

- (1) A place where stretcher-bearers leave their packs, under charge of a bugler.
- (2) A place for packs belonging to wounded, under a N.C.O.
- (3) A place for loading and unloading ambulance wagons.
- (4) A reception station for wounded, under a M.O.
- (5) A place where dressings are applied, under a M.O.
- (6) A section for wounded able to walk, under the senior N.C.O.
- (7) A place for wounded awaiting transport.
- (8) A place for wounded unfit for transport.
- (9) A place for the dying.
- (10) A mortuary.
- (11) A kitchen.
- (12) A wagon park where also improvised transport is prepared.
- (13) Latrines.

From the main dressing station wounded are sent to the field hospital. The main dressing station is, therefore, the most important link in the medical echelon.

*Field Hospital.*—The personnel consists of 6 medical officers and 31 N.C.Os. and men of the medical service.

There are 12 field hospitals to an army corps, each capable of accommodating 200 patients ; these units are under the control of the D.D.M.S. of the army corps, and are allotted by him to divisions, as required, to relieve the main dressing stations. They are usually kept in the rear of the army, and are only brought up when a battle is expected.

In personnel and equipment these units resemble our field ambulance tent divisions, but the subordinate personnel is only half of that in a tent division. They have no tents and are not so fully equipped with ward utensils. They always open in some village or group of buildings in which articles of household use can be obtained by requisition, hence these are not carried up and down the countryside. These units act as clearing hospitals in that they relieve the main dressing station of all wounded, and in conjunction

with the line of communication authorities arrange for passing the wounded down the line of communication. Should there be a number of wounded unfit for transport, one or more of the field hospitals is immobilized and becomes a temporary stationary hospital of the line of communication until in turn relieved by the *Kriegslazareth* or proper clearing hospital.

*Clearing Hospital.*—This unit does not exist as an independent unit in the German organization. On each line of communication there is a clearing hospital section. This consists of a number of medical officers and N.C.Os. of the regular and reserve army medical service, and is of sufficient strength to form the cadre of four clearing hospitals; the remainder of the personnel is obtained from local or voluntary aid sources. Material is obtained from the advanced depot of medical stores, and equipment from local sources.

There is also on each line of communication directorate a sick and wounded transport column which is largely made up of voluntary aid personnel; this column or a detachment of it moves up along with the clearing hospital and at once begins to make arrangements for evacuating the wounded.

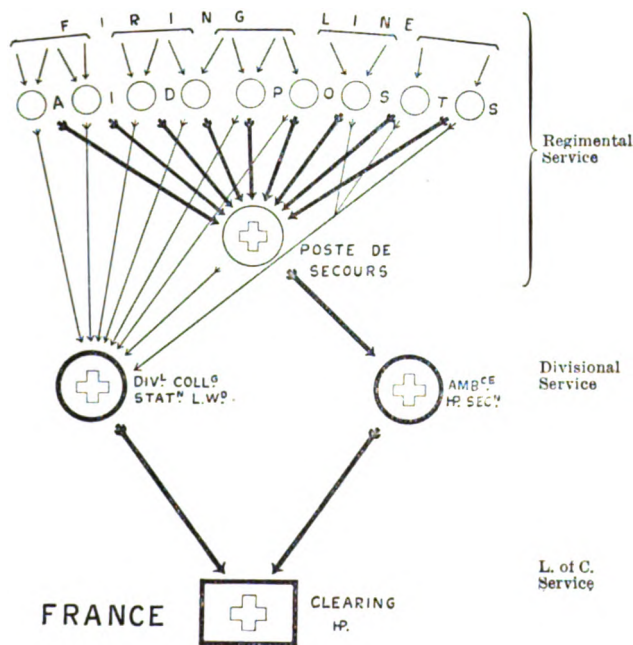
*The Advanced Depot of Medical Stores.*—A recent army order has allotted to this unit six motor ambulance wagons and six light motor wagons for equipment; these are to be used in the evacuation of wounded and in sending up fresh supplies of surgical material to field units.

*Stationary Hospitals.*—Stationary hospitals are established at important points on the line of communication where they are found to be necessary. One army medical officer is in charge of each; the personnel is mainly obtained from voluntary aid sources, and the equipment by local requisition. In organization they do not correspond to our stationary hospitals as they have no fixed establishment of personnel or scale of equipment. They are rather improvised hospitals, very much like those which Voluntary Aid Societies might be called on to establish for our Territorial Force.

*Hospitals in the Home Territory.*—On the outbreak of war most of the smaller military hospitals are closed. The larger ones are expanded to accommodate a large number of patients. At important centres one or more barracks are converted into hospitals. All of these are called reserve hospitals. Voluntary Aid Societies also have a number of fully equipped hospitals which are used in peace time for paying patients in order to cover the expense of maintenance. There are also a number of convalescent homes.

*French Army.*

The regimental personnel is of the same strength as that of the German organization ; when an action is about to commence one half remains with the fighting line and attends to the wounded who are grouped together in the *Refuges de blessés* immediately in rear of the battalion ; the other half forms a regimental dressing station, the *Poste de secours*. In the French regulations this is ordered to be placed immediately behind the regimental reserves.



From the *Poste de secours*, slightly wounded proceed to the divisional collecting station, those requiring further treatment are sent or carried to the *Ambulance*. The divisional collecting station is relieved by a convalescent depot detachment sent up by the P.M.O. of the army corps.

*The Bearer Companies.*—Each has 5 medical officers, 152 bearers, 11 ambulance carts and wagons, 4 medical stores wagons, 2 supply wagons, and a wheeled kitchen. There is one for each division, plus one in reserve for each army corps ; it works between the regimental dressing station and the *ambulance*. Its ambulance wagons go up as far as they can and form a *Relai d'ambulance*

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(our old collecting station) to which the bearers bring the wounded. The army corps bearer company also has attached to it a sanitary section, whose special duty is to undertake any sanitary work, e.g., disinfection of clothing or buildings, examination of water, food, &c.

Before discussing the field medical units of the French Army, I would like to point out the changes introduced in 1910. By the regulations issued in that year, the bearer companies were made into separate units, the field hospitals were abolished and the *ambulances*, except the cavalry one, were made uniform in equipment. At the same time the number of field ambulances was raised to eight per army corps, and a new unit, the hospital section, was introduced. Only one half of the field ambulances have transport and march with the division, the other half have no transport and together with the six hospital sections are kept in rear of the army somewhere about the *Gare régulatrice*.

If an *ambulance* becomes full of wounded, one or more hospital sections are brought up and united to it; the whole then becomes a temporary stationary hospital on the line of communication, while the immobilized *ambulance* is replaced by one of those in reserve which takes over the transport from the immobilized one.

The effect of this change is to reduce the amount of road space required by medical units marching with the division.

*The Ambulance* has a personnel of 6 medical officers and 38 orderlies; it opens in some suitable spot out of range of the enemy's fire, to receive wounded; dressings are examined and reapplied if necessary, and urgent surgical operations are performed. If possible; the wounded are evacuated, but if this cannot be done the *ambulance*, with the addition of a hospital section, as noted above, becomes a temporary stationary hospital on the line of communication. The hospital section is equipped to take care of 100 wounded.

*The Clearing Hospital* (one per army corps) has the same equipment and personnel as one *ambulance* plus one hospital section. Usually it is stationed at the *Gare régulatrice*; when an ambulance becomes immobilized the clearing hospital or one section of it is brought up to take over the patients and to arrange for their evacuation. This unit has 200 stretchers, 40 stretcher bedsteads, and 100 suspension apparatus for adapting vehicles for the transport of wounded. It also has available at the *Gare régulatrice* the material for equipping 4 temporary ambulance

trains, viz., for each train 132 apparatus for supporting stretchers, 400 stretchers and 400 blankets. Temporary ambulance trains are administered as a section of the clearing hospital but have their own personnel. This seems to be a very practical arrangement.

While the clearing hospital is stationary at the *Gare régulatrice* its personnel forms a rest and refreshment station. It arranges for feeding all men sent down from the front and classifies them according to the severity of the disability. Cases unfit to proceed further are accommodated in a temporary hospital, slight cases likely to recover quickly are located in a convalescent depot, others requiring longer hospital treatment are passed on to the hospitals of the home territory.

Road and railway rest stations, convalescent depots and temporary hospitals are opened where necessary on the line of communication. The Voluntary Aid Societies undertake most of the work, as well as establishing auxiliary field hospitals, i.e., temporary hospitals in towns in proximity to the line of communication.

#### *Austrian Army.*

In the Austrian Army the regimental medical personnel consists of: 1 medical officer in charge of each battalion with 2 to 3 additional medical officers for each regiment, e.g., a regiment of 4 battalions has 7 medical officers.

Each company has 1 medical N.C.O. and in place of the battalion medical cart employed in other armies 2 men to carry dressings and also to assist the medical officer in charge of the battalion. It has also 4 stretcher-bearers with 4 others in reserve. Each division has 3 divisional medical units corresponding to our field ambulances.

The medical officer in charge of the battalion and his dressers remain with the fighting line. The regimental stretcher-bearers fall out and form bearer detachments under the S.M.O. of the regiment. The remainder of the medical officers and N.C.O.s form an advanced dressing station for the group of combatant units in the immediate neighbourhood; it is specially directed that only as many of these advanced dressing stations are to be established as may be found absolutely necessary.

The divisional medical unit, has 6 medical officers and 200 men in all, and comprises the following sections:—

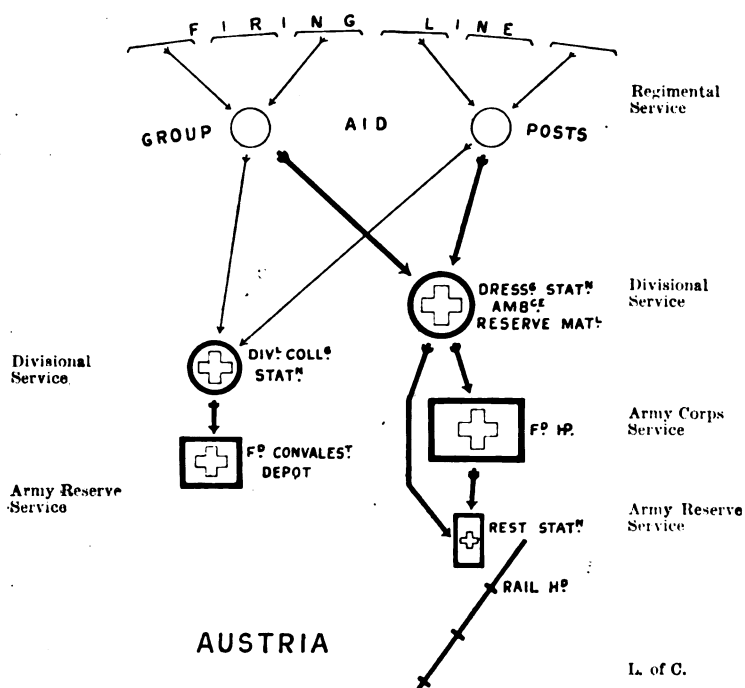
(1) *The Regimental Aid-post Echelon.*—This consists of 9 two-horsed wagons carrying dressings, instruments and medical



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comforts. One or more, as required, of these wagons is sent up to each group aid-post and thus provides the necessary equipment, there being no battalion medical cart. One of these wagons can also be detailed to accompany a detached column.

(2) *The Divisional Collecting Station for Slightly Wounded.*—The establishment laid down for this is 2 medical officers and a half field detachment of the medical service with 2 four-horsed wagons for material and equipment.



(3) *The Main Dressing Station.*—This corresponds to our tent division. The senior medical officer and 3 medical officers are allotted to this section. It opens in a number of sub-sections much in the same way as described under the German organization.

(4) *Wounded Transport Column.*—This has 15 four-horsed ambulance wagons (including the five supplied by the Teutonic Order). These wagons convey men unable to walk from the regimental dressing stations to the main dressing station. In mountain warfare the brigade is the fighting unit instead of the

division. There is a similar but smaller brigade medical unit which can carry its outfit by pack transport.

*Field Hospitals.*—There are 3 field hospitals to a division; each can accommodate 200 patients and has a staff of 3 medical officers, 1 priest, and 100 N.C.O.s and men. It has 5 ambulance wagons supplied by the Red Cross Society and 18 wagons for supplies and equipment, also one wheeled kitchen.

The duty of this unit is to take over from the main dressing station all serious cases so as to set free the divisional medical unit to accompany the division. They usually open in villages and obtain most of the articles required for household use by local requisition. These are army units under the G.O.C.-in-C. and are only temporarily allotted to divisions as required.

A very similar unit is the Mobile Reserve Field Hospital which receives sick during the period of concentration; it also furnishes personnel for sick rest stations and convalescent depots and can also be used as a clearing hospital.

The field convalescent depot has a staff of 2 medical officers and 25 men of the reserve section. It is used to look after slight cases likely to recover soon and in fact is a clearing unit for the divisional collecting station. It can take charge of 500 patients.

*The Mobile Rest Station.*—There are 2 to each army corps. Its function is to feed and arrange accommodation for the night for 200 patients, and it should also be able to provide good hospital accommodation for 10 to 15 patients who are unable to continue their journey. The staff of 2 medical officers and 25 men is found from the reserve.

*The Field Depot of Medical Stores.*—This unit is mobilized in the proportion of one for each army. It includes, when mobilized, the following units for each army corps belonging to the army: 1 mobile reserve field hospital, 2 field convalescent depots, 2 mobile rest stations, 2 improvised ambulance trains, 1 reserve supply of material.

At railhead there is usually a convalescent depot and a reserve field hospital. The hospital trains are mainly equipped and staffed by the Sovereign Maltese Order.

In the Austrian Army medical organization Voluntary Aid Societies fulfil a number of duties.

Thus the Teutonic Order furnishes 5 ambulance wagons for the divisional medical unit; the same Order provides the equipment for 4 field hospitals of 200 beds each, the personnel is furnished

by the Landwehr; each hospital has a wounded transport column attached to it.

The Austrian Red Cross Society provides 33 wounded transport columns with a total of 648 wagons; the War Office finds the personnel from the Landwehr. This Society also provides a number of field medical depots with supplies to replenish field medical units and has two field hospitals of 200 beds each. In addition it is prepared to accommodate some 4,000 officers and 23,000 men in hospitals and convalescent homes in Austria. It also provides all the first field dressings for the entire army.

#### CONCLUSION.

If you have been able to follow the general organization of the French, German and Austrian Armies you will have noted some similarities and some differences between their army medical service and that of our Territorial Force.

(1) *Regimental Medical Establishment.*—The medical officer in charge of a unit is part of the unit and mobilizes with it.

There are two medical officers to each battalion, although in our Territorial Force only one is mobilized. In foreign armies the regimental stretcher-bearers form part of the regimental medical establishment and are only employed for medical duties. This arrangement does not hold good in the British regular army or Territorial Force as we only have what are called auxiliary stretcher-bearers in the foreign organization. In foreign armies there is no regimental water party.

(2) *Medical Units.*—The Territorial Force possesses an advantage not enjoyed by any regular army in that its field ambulances are constituted on a war basis in time of peace instead of having to be hurriedly brought into existence on the outbreak of war, by collecting officers and men from various sources. This means a great deal, as officers and men should know each other and should have a fair idea of the work they are expected to perform.

(3) *Clearing Hospitals.*—This is the weakest point in the organization of the Territorial Force. A cadre for a clearing hospital has recently been sanctioned and should help to fill up the gap between the field medical units and the general hospitals. The evacuation of sick and wounded must always be one of the most difficult tasks which the medical service has to perform, and in our organization the clearing hospital is the principal agent in carrying it out. You will note that the German and Austrian organization provides more units for this work than we have in our regular army medical organization.

The main differences in continental methods as compared to ours are :—

(1) Compulsory service provides a much larger number of reserve personnel.

(2) The regimental medical establishments are more than double what ours are; this ensures the possibility of affording more thorough attention to the wounded in the first place.

(3) The medical units at the front are not so strong or so heavily equipped, and the bearer companies are separated from the field hospital unit.

(4) The number of reserve or reinforcing medical units is much greater than in our organization.

(5) Organized voluntary aid is freely employed as part of the army medical organization on the line of communication and in the home territory.

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## THE WORKING OF VOLUNTARY AID DETACHMENTS.<sup>1</sup>

By B. BALGARNIE, M.B.LOND., F.R.C.S.ENG.

*Assistant County Director, Hants Subdivision, B.R.C.*

I SHALL discuss Voluntary Aid Detachments under the following headings, viz.: (1) Their birth; (2) their boyhood; (3) in foreign countries; (4) at the present day.

### (1) THE BIRTH OF VOLUNTARY AID DETACHMENTS.

When M. Dunant, horrified with the horrors of that bloody campaign in 1859, succeeded in calling together a Conference at Geneva, in 1863, his action created a sensation throughout the civilized world. M. Dunant himself frankly admitted that what caused him to turn his attention to this subject was the heroic conduct of our national heroine, Florence Nightingale, who thus, in a sense, was the unconscious instigator of this world-wide movement, the formation of Red Cross Societies.

M. Dunant made two great postulates:—

(i) International recognition of the neutrality of all hospitals, and of the personnel and supplies of ambulances for the use of the sick and wounded of belligerents.

(ii) The organization of voluntary medical relief societies for the aid of the public medical services under the stress of war.

The first was not original, but the second was M. Dunant's own offspring; and throughout his life it was to voluntary aid that he especially devoted his energies.

Nations, especially at peace, have short memories, and when the Geneva Convention of 1864, preceded by the preliminary Conference of 1863, became an accomplished fact, it was hailed as a new heaven and a new earth.

History does nothing if it does not repeat itself, and if the histories of wars between 1581 and 1864 be investigated, one finds that there had been a steady attempt made between the combatants engaged, to alleviate the miseries of the battlefields; and during that period no fewer than 291 treaties had been drawn up for this laudable purpose. The best known was one drawn up in 1800 by Napoleon's chief medical officer, Baron Percy, and its five articles may be regarded as the framework of the Geneva Convention of 1864.

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<sup>1</sup> An address delivered to the Aldershot Command, Military Medical Society.

The Convention of 1864 did not embody Dunant's original views, which, as we have seen, were to have independent groups of voluntary workers organized for succouring wounded on the battlefield; in other words, the formation of Red Cross Societies. At the opening meeting, in 1864, it was made clear to the delegates that the object of the Convention was to draw up an agreement by which the regular organized medical services of armies would be enabled to carry on their work under the most favourable conditions; and that certain Powers had only consented to take part in the negotiations on the understanding that the Conference would have nothing to do with the resolutions of the 1863 Conference, at which Dunant's views on voluntary aid were given special prominence.

There is no doubt that the sentiments of Dunant, as determined in the Conference resolutions of 1863, took a great hold on the public mind, with the result that the Geneva Convention of 1864 was brought more or less into discredit. Many proposals were made to revise it; an attempt was made in 1868, chiefly due to the experiences of the war between Prussia and Austria in 1866, and certain new articles were added to the original Convention, but these were never ratified by the Powers, owing chiefly to the Franco-Prussian War having broken out.

The new Convention of 1906, in its Articles 10 to 16, expressly recognizes Red Cross Societies; thus it will be seen that forty-two years elapsed ere the views advocated by the founder fructified; and though the old Convention has done much to assist the military side of medical work on the battlefield, voluntary aid has existed more or less on sufferance.

Soon after the Geneva Convention was signed Red Cross Societies sprang into existence in every nation of Europe. France and Prussia were amongst the first in the field in 1864, Russia followed in 1867, while Great Britain was about last, as it did not form the first of its Aid Societies until 1870.

## (2) THE BOYHOOD OF VOLUNTARY AID DETACHMENTS.

It is unfortunately a truism, that our good old country is generally backward in adopting new ideas. So it has been with voluntary aid, for, as I have just now mentioned, we were the last in the field, and are still, I regret to say, a long way in the rear. Nevertheless, our Voluntary Aid Societies have done excellent service in many of the campaigns that have been fought during the last forty years.

Our slackness, when compared with other nations, is not to be wondered at, for, though we are a philanthropic nation, we are not a military one; and, unless our record of freedom from invasion—for upwards of nine hundred years—be rudely broken, is there any possibility of our ever becoming one?

“The National Society for Aid to the Sick and Wounded in War” was the first Red Cross Society to be established in England, and I should like to quote a passage from a speech of Lord Rothschild, when speaking of its foundation:—

“When the Franco-German War broke out in 1870, that gallant soldier, the late Lord Wantage—who had planted the colours of his regiment on the heights of Alma, for which he received the Victoria Cross, and who had served with distinction all through the campaign in the Crimea, who knew from experience the misery and suffering of wounded and sick soldiers in a campaign, and who was aware of how little was done in those days to alleviate men fighting for the honour and glory of their Sovereign and country—took advantage of the new Geneva Convention to start the Society over which he long presided, viz., the “National Society for Aid to the Sick and Wounded in War.”

Thus, as Dunant is regarded as the prime founder of the Red Cross movement, so Lord Wantage may be regarded as its founder in the British Empire.

The National Aid Society has done much. From 1870 to 1905 it expended half a million of money in assisting the sick and wounded in war. In the Franco-German War it provided £250,000, and employed nearly 200 agents, surgeons, and nurses. It accomplished similar good services in the Turco-Servian and Russo-Turkish Wars.

In our own campaigns it rendered assistance in the Zulu War of 1879, the Egyptian Campaign of 1884, the Boer War of 1881, and last, but not least, in the late South African War, 1899 to 1902. In this last campaign it expended £162,000. Twenty-one commissioners and agents were employed; the hospital ship “Princess of Wales” was chartered, and the hospital train “Princess Christian” purchased. The work in this war was carried out in connexion with and under the direction of the Central Red Cross Committee.

This Committee was established in 1899 with the object of bringing the National Aid Society, the St. John Ambulance Society, and the Army Nursing Service Reserve more in touch with the Army Medical Service in time of war, and the Foreign Office

notified all Foreign Chancelleries that this body was the only one authorized to deal with Red Cross matters throughout the Empire. This is the first occasion that the term Red Cross, as applied to a voluntary organization, was used. Its name was changed in 1904 into the "Central British Red Cross Council."

The Society as it at present exists was inaugurated at a meeting held at Buckingham Palace, on July 17, 1905, under the presidency of Her Majesty Queen Alexandra, and I cannot better explain the objects of the Society than by quoting Her Majesty's brief speech:—

"It has been on my mind ever since the South African War, when I became President, to try to reorganize the Red Cross Society on a more practical and sound basis. It affords me, therefore, the greatest satisfaction to learn that the Red Cross Council has consented to join hands with the National Aid Society, founded by that distinguished soldier, the late Lord Wantage, under one title, the

*British Red Cross Society.*

I therefore propose that the new organization should be based upon membership and association, and the members and associates of the Society should be recruited from all classes throughout the Empire.

"The Society shall be entirely voluntary, and while in touch with the War Office and Admiralty the Society shall be organized and act wholly independently of those departments in times of peace, but naturally in time of war it must be under naval and military control.

"I therefore appeal to all women of the Empire to assist me in carrying out this great scheme, which is essentially a woman's work, and which is the one and only way in which we can assist our brave and gallant Army and Navy to perform their arduous duties in time of war."

To simplify the objects of the Society a little more, I would briefly summarize them as follows:—

(1) To furnish aid to the sick and wounded in time of war, such aid necessarily being supplementary to that furnished by the medical departments of the Navy and Army.

To repeat Dunant's oft expressed sentiments: "It is impossible that the medical provisions of the Navy and Army, in the matter especially of personnel, can be maintained in time of peace at the standard demanded by the stress of war."

(2) To prevent the Medical Services being worried by offers of



help, in personnel or kind, in time of war, all such offers of help must come through the Red Cross Society.

I cannot help thinking that this provision must appeal to the Army Medical Service strongly, for one can well imagine the confusion that might reign at the War Office, if that building were besieged by would-be nurses and bearers, anxious to help, to say nothing of the hosts of gifts for the troops, from night caps to chocolates. The Red Cross Society in time of peace will have ascertained and tabulated the extent and nature of the voluntary aid which can be depended upon or expected in the event of war.

(3) It is not proposed that any stores or materials to any extent, at all events, shall be collected in time of peace, but each unit throughout the country will know where to put its hand on such stores at a moment's notice. For example, to give from my own experience in my own district: I have no hesitation in saying there is hardly a village of any size in the whole of the Hartley Wintney subdivision of Hampshire that could not equip a hospital, say, of twenty beds, at twenty-four hours' notice. I do not pretend to say a hospital with all modern improvements, but a hospital with decent beds and the ordinary furniture and utensils that patients would require. I venture to suggest that were a big engagement to be fought in the neighbourhood of Aldershot—I presume a not impossible contingency in case of invasion—all these hospitals would in all likelihood be filled to overflowing.

*How the Society Pays its Way.*—When the British Red Cross Society was formed in 1905 the National Aid Society was incorporated with it; the latter body possessed a certain capital sum which had been subscribed on previous occasions. The interest from this sum is sufficient for the expenses of the headquarters' organization, but, of course, all branches throughout the Empire are supported by their own voluntary efforts.

This capital sum can only be touched in case the Empire is involved in a war; in cases where foreign nations are at war, such as the recent war in the Balkans, all the help that was sent to the combatants was raised independently of the present Red Cross funds.

The branches are maintained by subscriptions of members and associates: the members subscribe one guinea per annum, or promise five guineas in case of a war in which British troops are employed; the associates subscribe five shillings per annum, or guarantee one guinea in like circumstances.

*Organization of the Red Cross Society.*—The Society is primarily

governed by a Council, which was elected by their Majesties; and as vacancies occur these can be filled up by the Council itself. *Secondly*, there are formed *branches* throughout the Kingdom or rather Empire.

In the United Kingdom these branches follow the counties and the county boroughs, and are identical with the County Association areas. The County Association, as you know, is concerned with the Auxiliary Forces of the realm; all Voluntary Aid Detachments, coming under this category, are nominally under the direction of the County Associations. Each County has its President, its Committee, its County Director, and Honorary Secretary.

The county is again subdivided into areas corresponding with the Poor Law areas, a very useful subdivision. These subdivisions are controlled by a Vice-President, a Committee, an Honorary Secretary, and an Assistant Country Director.

The Committee of a branch may either remain a *latent* Committee or may concern itself *actively* with Red Cross work.

A *latent* Committee does nothing in time of peace beyond getting promises of subscriptions, but in time of war it may at once proceed to organize, and deal with offers of voluntary aid. I fear, however, a latent Committee would still be latent when war arose, for there is no axiom more proved than this, unless you prepare for war during peace there will be no time to prepare when war comes. So I think we may dismiss a latent Committee without further remark.

*Active Committees.*—I shall refer to the work of Active Committees presently.

### (3) VOLUNTARY AID IN FOREIGN COUNTRIES.

I have examined the handbooks of the medical services of foreign armies, and I am going to give you the impression the perusal of those textbooks has left on me.

#### 1. *The First Impression is their complete Organization and Preparedness for War.*

Every state has its Voluntary Aid Detachments ready for war.

*Germany.*—I cannot do better than quote the organization that Germany has. At the head of all is an Imperial Commissioner and Military Inspector of Voluntary Aid. This appointment, which is made by the Emperor, is held during peace as well as war. The inspector has under him two assistant commissioners. All Government officials must give him whatever information he may require

to enable him to carry on his duties. In addition, one combatant and one medical officer from the head office are in constant touch with him and are appointed with a view to facilitate communications between him and the War Office. He has also the assistance of standing Committees of the German Red Cross Societies. The Imperial Commissioner is obliged to forward to the War Office annually a report on the state of the detachments, and the War Office on their part inform him what preparations should be made in the event of mobilization. He appoints delegates from V.A.D.'s to assist in the mobilization. When war breaks out, the Imperial Commissioner hands over his office to one of his assistant commissioners and joins the headquarters' staff of the Commander-in-chief in the field, where he directs voluntary aid in association with the Inspector-General of the Lines of Communication and Railways and the D.M.S. of the Field Force.

This organization, with its German thoroughness, though a type of the rest, struck me as the most workmanlike of the lot.

## 2. *Preparation in Matériel.*

As a humble local representative of the British Red Cross Society, I must confess I am overwhelmed when I read what is done abroad.

Here one can command perhaps a handful of army stretchers of an obsolete pattern, a few home-made ones, made by the help of an estate carpenter, and the *promise* of some beds and furniture should an invasion occur. What is this compared with what Italy can show.

*Italy.*—64 small ambulances for mountain warfare, 8 war hospitals of 100 beds, 8 war hospitals of 50 beds, 36 war hospitals of 50 beds for pack transport, 14 hospital trains of 200 beds, 1 hospital train in Sicily of 100 beds, 2 sets of equipment for hospital ships for the Navy, 1 set of equipment for a river ambulance, and 65 rest stations.

Italy's example suffices; but all the other countries are equipped, more or less, on similar lines.

## 3. *Membership of Voluntary Aid Societies.*

The figures of the various countries are so erratic that there does not seem much to be gleaned on this head.

Russia, e.g., has a membership of 1,000,000; France only 50,000; England, with the St. John Ambulance Association, some 100,000; and Italy's figures are only about 6,000.

4. *Finance.*

Here again the figures vary enormously. Russia heads the list with a million; Germany, Austria, and France about half a million; and England's capital sum, though not officially given, is understood to be about £70,000.

5. *Training.*

*France.*—France seems to be *facile princeps* in her endeavour to organize the training of her voluntary aid personnel. The premier society, viz., "La Société Française de Secours aux Blessés Militaires," has taken very active steps in establishing dispensary schools all over the country. There are three in Paris and about thirty-five in the provinces. Ladies attend these dispensaries, and may afterwards attend the civil hospitals in Paris. The course of instruction lasts five months, and a diploma is granted after a final examination.

These dispensaries have, I believe, been the cause of much ill-feeling on the part of the medical profession in France. They probably rob the profession of many patients, and as they are largely for instructional purposes, one can imagine that many cases are treated which ought to be under the care of the local practitioners. There are two other societies in France, which are also doing valuable work.

I shall not attempt to give any further details, and the three examples I have given show that these countries are alive to the importance of fostering the Red Cross movement to their utmost capacity.

I fear this country, however, being the last to start, is still the last in the field, and until the country can be brought to realize the necessity for voluntary aid she is likely to remain there.

## (4) VOLUNTARY AID AT THE PRESENT DAY.

We have seen that the British Red Cross Society came into being in 1905, but it was not until 1909 that Voluntary Aid Detachments began to be organized. Since this date the movement has made great strides.

Up to June, 1912, I find that in England, Scotland, and Wales there is a total of 1,475 detachments, with a total membership of just 44,000. I also note that there are considerably more than four times as many women's detachments as there are men's, and as regards individuals there are rather more than two women to one man.

Our County of Hants is regarded as the premier county; as regards personnel, without the Isle of Wight, the figures are just below Sussex, but with the Island they are considerably above, the numbers being 2,600.

*Formation.*—We must first inquire how Voluntary Aid Detachments are formed. I cannot do better than refer to Form D, which is issued by the British Red Cross Society. It is headed "Medical Organization in Case of Invasion."

Under the scheme the British Red Cross Society is the body recommended by the War Office to the County Associations for the carrying out of this important work.

*Objects in View.*—The pamphlet then gives the objects in view. It begins by stating that the medical organization of the Territorial Force, though complete in many details, is lacking in certain units, which are as follows: (1) Clearing hospitals; (2) stationary hospitals; (3) ambulance trains; (4) other formations.

You will notice there are two administrative authorities, viz., the County Associations and the British Red Cross Society, with the result that there are many complaints that we do not know who are our masters; in fact, we are rather like lost sheep on the mountain side.

#### *Keeping up Interest.*

Having got our detachments formed, our great difficulty is to keep our personnel interested, and to prevent them forgetting what they have already learnt: and there indeed is the *rub*.

When you have put up imaginary fractured clavicles with triangular bandages about fifty times and squeezed a small boy's ribs, in an attempt to resuscitate an imaginary drowned person until his sides ache, our members begin to find the process a bit wearisome, and I cannot blame them. The only way to make Voluntary Aid Detachments really efficient is to find some means for keeping up their interest, and so I shall be very grateful for any suggestions that any members of your Society can give.

*To keep up Interest.*—(1) Lectures during the winter on invalid cooking, hygiene, &c.

(2) *Local Competitions.*—Our late Vice-President, Lady Calthorpe, very kindly presented two very handsome silver bowls, to be competed for annually by detachments from the different parishes in the area. This evokes keen interest and great preparation for the event.

(3) *Divisional Competitions*.—Basingstoke Division challenged the Hartley Wintney Division quite recently, the subjects being triangular and roller bandaging, sick cooking, bed making, &c.; teams practise for weeks beforehand, and they become very efficient in these details.

(4) *By Small Field Days*.—Before last summer, when we had a scheme given us, we used to devise our own little manoeuvres—e.g., in September, 1911, making Winchfield Station an entraining station, we brought in at night time about sixty or seventy wounded, which were collected at five or six different points agreed upon, in improvised farm carts, the distances being generally three or four miles from the station. The casualties were first placed in a rest hospital and then entrained.

(5) *By Combined Manœuvres*.—Certainly the most instructive piece of work that we have done was in July last, and this was on receipt of orders from the County headquarters.

*The Scheme was this*: A battle was fought in the vicinity of Aldershot and Fleet. This was made quite realistic by General Lomax kindly arranging a divisional exercise on the day. The casualties were brought in by four ambulance wagons to the number of 150. The previous night we had fitted up sixteen cattle trucks with strong chestnut poles and rope slings, two being fitted up with Colonel James's modification of Zavodovski's method. Five clearing hospitals had been established in buildings or tents, where the wounded were temporarily placed preparatory to being entrained.

Two really excellent stationary hospitals (which for the purposes of the scheme were called base hospitals) were established at Basingstoke. Although the casualties were not received until 3 p.m., the train left at the scheduled time, 5.30, with 100 sling cases and fifty sitting up cases in three railway coaches. Each stretcher was lashed to prevent swaying either laterally or fore and aft, and I am pleased to say not a single lashing gave way, though I admit I was nervous.

At Basingstoke improvised ambulance carts conveyed the wounded to the hospitals, which were situated about half a mile from the station. I might add also that we cooked, in an extemporized field kitchen, a good hot dinner for four attendants and the casualties, 150 in number, which was much appreciated.

Now you cannot carry out a scheme like this for nothing, and it cost us at the Fleet end about £50. The War Office did not help, nor the Red Cross Society, nor the County Association; the money had to come out of our own pockets. I mention this in

no niggardly spirit, but just to state that many districts which do not possess wealthy friends could not undertake it.

Our expenses would have been much more but for assistance in kind; and I would like to specially thank your Corps, who kindly lent us some 100 army stretchers which were invaluable, for the expense of hiring these or making them would have been prohibitive.

#### CONCLUSIONS.

(1) That Dunant's views, which were enumerated in my text, still hold good, viz., that voluntary aid is essential in time of war.

(2) That all civilized countries have recognized this fact.

(3) That we are the last to start, and are many, many years behind our foreign friends.

(4) That we have a large, and I venture to think quite large enough, body of men and women, keen on their work and eager for improvement.

(5) That such enthusiasm should be freely encouraged by the authorities.

(6) That at present the V.A.D.'s are wasted organizations.

(7) That in time of war mobilization would be next to impossible.

(8) That there should be some high War Office official, equivalent to the German Imperial Commissioner, who with a staff should devote the whole of his time to the matter of voluntary aid.

(9) That the War Office might help enormously by allocating instructors to small groups, say two or three County Divisions.

(10) That they might also help by giving or lending such material as they could easily spare.



## United Services Medical Society.

### PULMONARY TUBERCULOSIS IN THE ROYAL NAVY, WITH SPECIAL REFERENCE TO ITS DETECTION AND PREVENTION.<sup>1</sup>

BY CAMPBELL ROSS, M.D. GLAS.

*Surgeon, Royal Navy.*

PULMONARY tuberculosis is not a disease readily associated with sea life, and certainly not a disease one would expect to be common in the Royal Navy, composed as it is of picked men, leading an active, healthy life.

Sea-air is supposed to be inimical to the *Bacillus tuberculosis*, and sea voyages are frequently recommended as a cure for its ravages. In fact, the whole life and environment of the sailor would lead one to believe that pulmonary tuberculosis would be one of the least common of diseases at sea.

A mere glance at the statistics published yearly in "The Health of the Navy," however, at once proves how fallacious is such a belief. Tuberculosis, far from being a rare disease in the Navy, is one of the commonest and is responsible for more invalidings and deaths than almost any other disease.

The figures for 1911 read:—

Number of cases	..	..	286, or 2.44 per 1,000
Invalidings	..	..	237 „ 2.02 „
Deaths	..	..	38 „ 0.32 „

and the number of days' sickness is 25,194.

This means a great loss to the service, not only of time but also of men, many of whom are highly trained in their special branches, gunnery, torpedo, &c.

In the figures given in "The Health of the Navy," for 1911 (the last published) we find the greatest number of invalidings are due to:—

(1) Diseases of the circulatory system	..	..	329
(2) Diseases of the nervous system	..	..	282
(3) Tuberculosis	..	..	237

while the greatest number of deaths arise from:—

(1) General injuries	..	..	68
(2) Tuberculosis	..	..	38
(3) Diseases of the circulatory system	..	..	38

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<sup>1</sup> Published by permission of the Medical Director-General of the Navy.



Of the 286 cases of tuberculosis recorded, the lungs were affected in by far the greatest number of instances; 245 cases, or just six-sevenths of the total, being cases of pulmonary tuberculosis.

In addition to these 245 undoubted cases of pulmonary tuberculosis, there were recorded under Diseases of the Respiratory System, 63 cases of phthisis and 12 cases of hæmoptysis, many of which were, I have no doubt, due to infection of the lungs by the tubercle bacillus, though it could not be actually demonstrated.

The reasons why pulmonary tuberculosis should be so common in the navy are not difficult to find.

Sea-air may be inimical to the tubercle bacillus, and sea voyages may be recommended as beneficial to, or curative of consumption, but the sailor does not spend his life perpetually inhaling ozone, nor basking in the sunlight in a deck chair sheltered from the wind.

With the abolition of masts and yards, and the advent of steam, much of the open-air life of the sailor has gone, and most of the work in modern fighting ships is now done in confined quarters to which fresh air is only admitted through ventilating trunks, and where direct sunlight—the greatest enemy of the tubercle bacillus—never penetrates.

It is very difficult to form an opinion from the records as to the relative amount of pulmonary tuberculosis in the navy now, and the amount in the days of sailing ships. Diseases were not as carefully classified then as now, and the term phthisis probably included many non-tubercular diseases of the lung. The figures for the five years 1856-1860 (the first years of publication of "The Health of the Navy") read:—

PHTHISIS AND HÆMOPYSIS.

Cases .. .. .	7·0 per 1,000
Invalidings .. .. .	5·4 ..
Deaths.. .. .	2·3 ..

These figures, allowing that a considerable proportion of cases were non-tubercular, point to pulmonary tuberculosis being even more rife then than now.

From these figures and from the fact that the disease is diagnosed in earlier stages and with more certainty than formerly, we are justified in concluding that pulmonary tuberculosis is less common in the fleet now than it used to be, and despite the fact that sailors now lead a less open-air life than they did then.

This decrease is due to the better hygienic conditions of the sailor's quarters, the better quality of his food, both of which factors

go to improve his resisting powers when exposed to infection, and to the prompt segregation of those suspected to be suffering from this disease; also to the more careful selection of recruits on admission.

This is supported by the following statement from "The Health of the Navy," 1910: "Although there are considerable fluctuations in the amount of tuberculosis recorded annually the case ratio has, despite the more accurate classification and diagnosis evidenced by the fall in the amount of invalidings for phthisis, tended to decrease during the last few years. The decline of the disease among the general population ashore is no doubt reflected among the men recruited for the navy, and other factors probably aiding in the decrease are the prompt removal by invaliding of possible sources of infection in the shape of definite cases of pulmonary disease, and the improvements which have been made in late years in the general environment of the sailor."

#### THE CAUSE OF PULMONARY TUBERCULOSIS.

Pulmonary tuberculosis is the result of the morbid changes produced in the lungs by the bacillus tuberculosis discovered by Koch in 1882. There are several varieties of the bacillus, the human, the bovine, and the avian types, and there is a form found in fish. Of these only the human and the bovine are of any great practical importance.

The *Bacillus tuberculosis* is somewhat difficult of culture, being of a very slow growth, but its staining reactions are very characteristic. Being acid and alcohol fast, it is easy to differentiate from other bacilli, and this fact more than compensates for its difficulty of culture.

It has great resisting powers and can live for months in dried sputum. When obtained from house dust it can be cultivated and will produce symptoms of tuberculosis when injected into susceptible animals. It also lives for weeks in decomposing tissues. It is quickly killed by direct sunlight, and by such powerful disinfectants as carbolic acid (1-20), mercuric chloride (1-1,000), &c. Its great resisting powers and some phases of its cultural growth incline some authorities to regard it as a bacillary form of one of the streptothrix group.

Tubercle bacilli reach the lung by two main routes, inhalation and ingestion, the human type being inhaled, and the bovine type mainly ingested. Koch, in his London speech in 1901, stated that the principal source of infection was inhalation of the human bacilli derived from dried sputum.

Von Behring in 1903 went to the other extreme and stated that ingestion of tuberculous milk was the chief cause of infection in children and in adults. In the latter the infection was due to the waking up of bacilli ingested in childhood and lying dormant. Calmette and his school supported Von Behring, but went further and stated that in adults pulmonary tuberculosis was always due to the ingestion of tubercle bacilli, the bacilli reaching the lungs via the mesenteric glands, the broncho-tracheal glands, and the lymph channels and blood-vessels.

Many experiments showing how anthracosis of the lungs can be produced in animals by introducing Indian ink into their alimentary canal were produced as evidence of the ingestion theory, and opinion generally swung round to support Calmette's view. Now, however, men are returning to Koch's original view, namely, that inhalation of human bacilli from dried sputum is the chief cause of pulmonary tuberculosis in adults.

Sir John McFadyen reviews all the experimental evidence and comes to the following conclusions :—

(1) The inhalation of tubercle bacilli suspended in the atmosphere is a very certain method of infection in susceptible animals, even when small doses of bacilli are employed.

(2) Experimental infection with tubercle bacilli by way of the alimentary canal is comparatively difficult to realize even in highly susceptible animals, and success is certain only when large doses of bacilli are administered.

(3) With few exceptions, in animals experimentally infected with tuberculosis by way of the intestine, the primary lesions are intra-abdominal, and the intra-thoracic lesions when present are secondary.

(4) Inhalation is probably the commonest natural method of infection in those species (man and cattle) in which the primary lesions of tuberculosis are usually intra-thoracic.

(5) Naturally contracted cases of tuberculosis in man and other mammals can be ascribed to infection by ingestion, only when the lesions revealed at the post-mortem examination are confined to the abdomen, or when the existing abdominal lesions are recognizably older than those present elsewhere in the body.

Bullock also takes the same view, and gives the following arguments in favour of inhalation as the main cause of infection in pulmonary tuberculosis :—

(1) The great dissemination of tuberculous sputum by multitudes of consumptives.

(2) The early anatomical lesions in the lung.

(3) That very minute doses induce tuberculosis when inhaled, the lung being apparently the most easily affected of all organs.

Kitasato also points out the fact that while pulmonary tuberculosis is as common in Japan as in any other country, cow's milk is drunk very sparingly, is almost never used for feeding infants, and that Japanese cattle are practically free from tuberculosis.

Further, in pulmonary tuberculosis the bacilli are almost invariably of the human type, as can be demonstrated by experiment in over 90 per cent of the cases.

On the other hand, the Royal Commission on Tuberculosis in their final report stated that a considerable amount of human tuberculosis was caused by bacilli of the bovine type, and that tuberculosis may be communicated to man from infected milk and from tuberculous meat.

And the fact that the bacilli in pulmonary tuberculosis are generally of the human type, does not entirely exclude the ingestion theory, for human bacilli may be ingested in food contaminated by consumptives, and also in considerable numbers by children crawling about floors and licking up infected dust. Bovine bacilli, too, may acquire the characteristics of the human type by long residence in the human body.

Horder takes a middle course and states :—

(1) That there are two main routes of entry of the bacillus, ingestion through the alimentary tract and inhalation through the lungs.

(2) That it is accepted by most authorities that the route by ingestion is commoner in children, and that by inhalation commoner in adults, this being proved by the fact that in children the bovine type of bacilli is commoner.

(3) That tuberculous lesions developing later in life are more likely to be due to reinfection from without than to auto-infection from a focus developed in childhood and lying dormant.

(4) That other routes of infection are rare.

Summing up, we must conclude that while sources of infection may be found in food, principally in milk, and must be looked out for and guarded against, the chief source of infection in pulmonary tuberculosis lies in the inhalation of contaminated dust, and that the dust is contaminated by men who have an open tuberculous lesion.

Many men in apparent perfect health may have in their lungs dormant tubercular foci. These foci may remain dormant all their

lives, but there may come a time when on account of exposure, overwork, worry or ill-health, the bodily defences are weakened, and these dormant foci are kindled into active tubercular lesions. These cases then, and we must presume that there are a good proportion of them, if they are not actual tubercle carriers, are at least potential sources of infection.

The two following cases would seem to bear this out. They are those of two marines who were nearly drowned owing to the swamping of a whaler while an armed party was being landed at Bundar Abbas to protect the British Consul there from attack by unfriendly Afghan tribes. Briefly they are as follows:—

Case 1, aged 25, Private, R.M.L.I., serving on board H.M.S. "Perseus." Placed on the sick list May 17, 1912, having been nearly drowned by the swamping of the whaler on the previous day. He swallowed a large amount of water and severely strained himself in expelling it. During the night he had a dangerous hæmoptysis. He subsequently developed cough and expectoration, and signs of pulmonary tuberculosis. Tubercle bacilli were demonstrated in his sputum, and he was invalided home. After a short stay in the R. N. Hospital, Chatham, he was finally invalided out of the service for pulmonary tuberculosis.

Case 2, aged 24, Private, R.M.L.I., serving on board H.M.S. "Perseus." He was nearly drowned in the same accident and was sent into hospital at Bundar Abbas unconscious. He recovered from the effects of submersion, but ten days later he developed a right-sided pleurisy. This cleared up but left him with a cough and expectoration, and signs of pulmonary tuberculosis developed. Tubercle bacilli were found in his sputum and he suffered the same fate as his companion.

Both men were apparently in good health when the accident happened, and it is quite conceivable that the shock, exposure, and other effects of submersion, may have weakened their resisting powers and caused dormant tubercular foci to kindle up into active tubercular lesions.

#### THE DIAGNOSIS OF PULMONARY TUBERCULOSIS.

The early diagnosis of pulmonary tuberculosis before tubercle bacilli have made their appearance in the sputum, and while the physical signs are yet uncertain, presents a difficult problem.

It is a difficult problem in the wards of a hospital where every opportunity for accurate observation of clinical signs and symptoms, and all means of laboratory and radiographic investigation are at

hand; it is doubly difficult on board ship, where the noises incidental to ship life, the running of engines and the movements of the ship, render accurate appreciation of early physical signs practically impossible, and where other methods of investigation, laboratory and radiographic, must of necessity be very limited.

Yet it is on board ship where space is limited and men live in constant close personal contact that it is of the greatest importance to recognize the cases at the earliest opportunity, in order that they may be removed to hospital before they spread infection broadcast.

When ships are within reach of the naval hospitals all suspicious cases can be sent in for full investigation, and medical officers now recognize the importance of early diagnosis, but it often happens when a ship is on isolated service that this is impossible. Then the onus of early diagnosis rests on the medical officer of the ship, who, if he diagnoses or suspects pulmonary tuberculosis, must make his own arrangements for the prevention of infection and treatment of the conditions.

Recognizing this the Admiralty supply most large ships, all "parent" ships (ships in charge of small ship flotillas) and all ships on isolated service, e.g., gunboats on the Chinese rivers, with an excellent microscope, having a  $\frac{1}{2}$  in. oil immersion objective, and a small but complete bacteriological chest.

#### PROPHYLAXIS OF PULMONARY TUBERCULOSIS IN THE ROYAL NAVY.

Before considering the special measures taken to prevent the spread of pulmonary tuberculosis, a few notes on the general hygiene of the Royal Navy may be useful.

It must be remembered that ships are primarily fighting machines, and many considerations must be subjected to those of armaments, offensive and defensive.

*Accommodation.*—This on fighting ships is very limited, owing to the relatively large crew and the space taken by armaments and magazines, engines, boiler-rooms, and coal bunkers, speed and range of action being very important. The cubic space in super-dreadnoughts works out at about 180 cubic feet per man, which compares very unfavourably with the 1,000 cubic feet required by the Board of Trade in a workhouse. At present, however, it is the best available, and may be increased in the future as labour-saving appliances, internal combustion engines, &c., may very considerably reduce the number of men necessary.

*Ventilation.*—This is one of the most important and at the same time one of the most difficult subjects in naval hygiene. The chief difficulties are :—

- (1) The small amount of cubic space per man.
- (2) The impervious nature of the material used in ship construction.
- (3) The division of the ship into watertight compartments which have no intercommunication.
- (4) The fact that much of the accommodation lies behind armour which would be weakened if pierced by apertures, and also that much of the space is below the water-line.

Also we might add the traditional dislike of fresh air by the average sailor.

In the older type of ship, ventilation was almost entirely natural. The air was renewed by gaseous interchange through ports, scuttles, hatches and skylights. Spaces below the water-line were ventilated by cowls which could be trimmed to or from the wind, and made to act both as inlets and outlets. The only compartments supplied by fans were the engine and boiler rooms, much air being necessary in the former to keep it as cool as possible, and in the latter for the combustion in the furnaces. The more efficient ventilation in these compartments explains why pulmonary tuberculosis is less common in stokers and engine-room ratings than in seamen. There are still many ships of this type in commission, and in small ships natural ventilation is the only kind practicable.

Natural ventilation is defective because of its uncertainty. Bad weather may cause the shutting of all inlets and outlets, and in sleeping compartments the men nearest the scuttles almost invariably close them. Cowls are useless when the ship is stationary and there is no wind. They are also undesirable as they increase the size of the ship as a target.

In modern large ships ventilation is almost entirely artificial, and is only supplemented by natural ventilation in compartments which are above the water-line and not behind armour.

Air is impelled by fans through ventilating trunks which have louvred openings into the various compartments. The division of the ship into watertight compartments necessitates a decentralized system. The fresh air is drawn through "mushroom tops" situated on the upper and flying decks, having a mechanical arrangement which allows air but not water to enter. The air passes over hot pipes and so is warmed, but can be directed unheated into the trunks by a by-pass. The results of this method are very good, considering the smallness of the cubic space per man.

Surgeon Edgar, R.N., and Assistant Constructor Bentley,

R.C.N.C., conducted some experiments in the "Bellerophon," an improved dreadnought, which gave the following results:—

Two typical compartments, the petty officers' mess, and the stokers' mess deck, were taken, and the times 10 a.m. and 3.30 a.m., when the atmosphere of these was best and worst, were chosen:—

		Time	CO <sub>2</sub> per 1,000	General impression
Petty Officers' Mess	..	10 a.m.	.. 0.51	.. Fairly good
		3.30 "	.. 1.2	.. Close
Stokers' Mess Deck	..	10 "	.. 0.75	.. Close
		3.30 "	.. 1.1	.. Very close

This gives a very fair result, though the CO<sub>2</sub> readings are higher than those allowed in most books for well-ventilated rooms.

Leonard Hill, however, has proved that the discomforts and dangers of badly ventilated compartments are not due to the increase of CO<sub>2</sub>, the diminution of oxygen, or even to poisonous emanations in the breath, but to increased heat and increased humidity, hot damp air not only relaxing the nasal and buccal mucous membranes, and thus rendering them more vulnerable, but being most favourable to the life and activity of most pathogenic bacteria. CO<sub>2</sub> up to 4 per cent in the atmosphere only causes deeper breathing, and when it is increased up to 6 per cent the amount in the lungs remains unaltered; the amount of oxygen in a badly ventilated room is rarely less than that of some health resorts at an altitude of 10,000 ft.

He concludes from this that an atmosphere which can be kept cool and dry is generally all right, and this can be accomplished, failing other methods, by keeping the existing atmosphere moving.

The advantages of artificial ventilation are, therefore, a constant supply of fresh air; or if the inlets have to be closed down on account of heavy weather or large-gun practice, the existing atmosphere can be kept circulating, and the temperature and relative humidity to a certain extent kept down.

Suggested improvements in ventilation would be:—

- (1) More cubic space per man.
- (2) Separate ventilating and heating systems.
- (3) A better disposition of the inlets in compartments.
- (4) A combined supply and exhaust system.
- (5) A method of preventing objectors to fresh air tampering with or closing the inlets.

At present a Committee on Ventilation in the Royal Navy is sitting. Their recommendations have not been published yet, but when they are good results may be looked for.



Summing up, ventilation on board ship, though it still has its faults, is certainly much better now than formerly, and the decrease in pulmonary tuberculosis in late years is no doubt largely due to this improvement.

*Heating and Lighting.*—Heating in modern ships in the men's quarters is accomplished by passing the air supplied by the ventilating system over hot pipes.

Opinion now is that air so treated loses a certain vitalizing principle, and I think more satisfactory results would be obtained were separate systems introduced, the heating being effected by radiators.

*Lighting.*—In modern ships, as armour increases, so artificial light replaces natural. Electric light is almost invariably used, and is of excellent quality and quantity, but the unavoidable absence of sunlight, which has so great a lethal effect on the tubercle bacillus, is to be deplored.

Still, on the principle of bringing Mahomed to the mountain, bedding, &c., can and ought to be brought up on deck and exposed to fresh air and direct sunlight as much as possible.

*Food.*—Two factors have in recent years simplified the food problem in the navy. The first is steam propulsion rendering the time between ports very much shorter; the second is the introduction of facilities for cold storage. Most modern ships can now carry a fortnight to three weeks' supply of fresh provisions. This change from the days of salt junk and weavily biscuit must be reflected in the general health of the sailor. The diet now on board ship is good, varied and well cooked, and ample time is allowed not only for eating, but also for the short period of relaxation afterwards that so aids digestion and assimilation.

Fresh meat and vegetables are obtained from the Government Victualling Yards or from private contractors; they can also be purchased locally where it is impossible to get them by the former means. Fresh food is inspected by the paymaster when it comes on board, and if he has any doubts as to its purity he calls in the medical officer of the ship to see it. The decision of the latter is final. Paymasters receive a special course in food inspection, and it is part of the courses for medical officers at Haslar and Greenwich. All fresh milk received on board must be boiled or pasteurized, and the result verified by means of the Ortol test.

Modern large ships have bakeries and excellent bread is made on board. In small ships it is got by contract. Biscuits when used are now supplied in air-tight tins.

Officers provide their own cooks. Those for the men come from the Government Cookery School at Portsmouth. Cooks and bakers must undergo a special medical examination.

Each man is allowed a certain ration, and in addition gets fourpence a day for the purchase of additional articles of diet from the ship's canteen. The latter is in the hands of private contractors, subject to Admiralty supervision.

*Clothing.*—Sailors are well and warmly clad; service flannel, which is much worn, being of particularly good quality. The sailor's uniform is too well known to be described here. It is hygienic and comfortable.

*Rest and Relaxation.*—The ship's company have seven hours' sleep nightly, 10 p.m. to 5 a.m., and provided a man's conduct is good, he is very well off in the way of leave.

*Exercise.*—Since the abolition of masts and yards, it has become increasingly more difficult to provide sufficient exercise to keep the sailor fit. A system of Swedish gymnastics was introduced some years ago, which is now giving admirable results. The system aims not at developing large muscles and encouraging fancy tricks on apparatus, but at developing the quickness and co-ordination of all muscles in the body. The exercises are carefully graduated, the hardest being in the middle of each "table," so that the heart and respirations gradually quieten down. On board a quarter of an hour is done daily on the upper deck by all hands, the training being optional in the case of petty officers and men over 35 years of age.

*Personal Habits and Cleanliness.*—In the way of personal habits and cleanliness, the sailor compares well with any other class of man. Drink beyond the daily tot of grog cannot be procured on board, and if he has outbursts ashore they are only periodic and less likely to do harm than continual soaking. Sobriety in the Royal Navy is increasing each year.

Spitting has tended to disappear concurrently with chewing, which in the navy is now a thing of the past.

*Water Supply.*—Fresh water is obtained by distilling, the distilled water being aerated to take away the mawkish taste. At times it is got ashore from guaranteed supplies. Where the supply is uncertain, i.e., at a foreign port, samples are tested chemically by the medical officer, and though a chemically pure water may not be bacteriologically pure water, it is all that can be done on board ship.

*Drainage and Disposal of Refuse.*—With an abundant supply of sea water at hand, efficient means of pumping, and the finest refuse

destructor in the world all round the ship, drainage and disposal of refuse present no difficulty and is thoroughly efficient.

Ashore the sailor lives in barracks which are up-to-date and hygienic, otherwise his life, food, &c., are as on board ship.

To conclude, the naval man nowadays is well housed, well fed, well exercised, and well looked after, and his life, food and surroundings compare most favourably with those of similar classes ashore.

The special measures taken in the Royal Navy to prevent the spread of pulmonary tuberculosis run on the following lines:—

(1) The early removal of foci of infection, in the shape of tubercular men with “open” lesions.

(2) The education of men in health principles, the dangers of disease, and the modes of infection.

(3) Improvement of the general hygiene of the men and of the navy generally.

(4) Careful examination of recruits.

(1) All cases of pulmonary tuberculosis in which tubercle bacilli have been demonstrated, are invalided out of the service, both officers and men.

Early diagnosis has already been discussed, and mention has been made of the excellent microscopes supplied to ships. All methods of diagnosis are available at the home hospitals where cases are sent for confirmation before being finally invalided.

(2) Medical officers of ships are now required to give quarterly to the whole ship's company, taken in divisions, a series of health lectures, each series to consist of four lectures on the following subjects:—

(i) General Hygiene and Health Principles.

(ii) Tuberculous Disease and its Prevention.

(iii) Venereal Diseases.

(iv) Alcohol and its Abuses.

That these lectures do a lot of good there is no doubt. Most men take a great deal of interest in them, as evidenced by the intelligent questions often asked at the end of a lecture.

(3) Recently a committee has been inquiring into the subject of pulmonary tuberculosis in the Royal Navy. Their recommendations were embodied in a Circular Letter (No. 14), dated May 20, 1912, as follows:—

“My Lords Commissioners of the Admiralty having had under consideration the steps which should be taken for the prevention and early detection of cases of tuberculosis in H.M. Navy, have

decided that the following measures are to be brought into operation without delay.

“(i) Constant medical observation is to be made of men with a history of hæmoptysis, bronchitis, pleurisy, or who appear to be in a low state of health, and of those who are found to be losing weight. Men who suffer from colds and coughs should be encouraged to seek for advice. When medical examination of the ship's company takes place, special attention should be paid to possible cases of pulmonary tuberculosis.

“(ii) The weight of all officers and men under the age of 36 is to be taken once every quarter and recorded in a book kept for the purpose. This duty is to be carried out by physical training instructors, and the record is to be communicated to the medical officer.

“(iii) In order to diminish dust the decks are to be damped with a disinfectant before sweeping up, but any great dampness between decks is to be avoided. Every endeavour should be made to prevent spitting on the deck, and this point should be emphasized in health lectures.

“(iv) Blankets and deck cloths are to be sterilized from time to time, as necessary, by ships carrying disinfectors.

“(v) All fresh milk is to be pasteurized or boiled, before issue, and the result verified by the Ortol test.”

These were supplemented by Order 810 in the Admiralty Weekly Orders as follows:—

“(i) So far as possible the chests of all men are to be thoroughly examined before draft. This applies specially to small drafts and drafts for foreign service. In other cases time may not permit of a complete examination.

“(ii) The medical officer for physical training when borne, is to record on the medical history sheets the state of the chests of all men passing physical training.

“(iii) As soon as a ship commissions, very special attention is to be given by the medical officer in charge to see that paragraph 2 of Circular Letter 14 is carried out.

“(iv) A thorough examination of all the men's chests is to be made as soon as possible, beginning with men on the sick and excused list, and anyone attending the sick bay for examination, e.g., any men in small drafts leaving or joining the ship who have not been examined lately.

“(v) The result of every examination is to be entered on a man's medical history sheet, and in an alphabetical book, to be kept in

each ship for information on board. This will prevent repeated unnecessary examinations.

“(vi) On a ship paying off, notes of those men who have been under observation are to be sent to the medical officer in charge of the depot, who will send like notes to ships on commissioning.

“(vii) The examining of chests by medical officers should coincide so far as practicable with the recording of weights by physical training officers (paragraph 3, Circular Letter 14).”

A further measure which should be emphasized is the disinfection that should be employed when a case of tuberculosis has been discovered. All men whose hammocks have been slung within a certain radius of the man should have them disinfected, and a modified scheme of disinfection should be laid down, as in the case of one of the infectious fevers. Large ships now carry efficient disinfectors of the Washington Lyon type, and the problem does not present much difficulty.

With regard to paragraph 4 of the Circular Letter, reference may be made here to a lecture delivered by Fleet-Surgeon Gaskell, R.N., to the United Services Medical Society. He pointed out that though the cleanliness of a man-of-war was proverbial, yet hygienically it was not perfect. This he ascribed to:—

- (1) Overcrowding.
- (2) Defective methods of removal of dirt.
- (3) Dust-traps, as corners in angle-irons, &c., cork painting, indifferently laid corticene on decks, or corticene worn and cracked, allowing filth to accumulate underneath, fancy woodwork placed round masts, &c., &c.

The remedies he advocated were:—

- (1) Rounded corners and smooth surfaces in living quarters.
- (2) Vacuum cleaning.
- (3) Washable canvas deck cloths and covers for tables.
- (4) Enamelled iron tables, &c., on the mess decks.

#### THE TREATMENT OF PULMONARY TUBERCULOSIS IN THE NAVY.

When a man is discovered to have pulmonary tuberculosis on board ship, he is sent to one of the naval hospitals at the earliest opportunity. Till that can be done treatment on board must be largely dictated by circumstances. If the weather permits, the best plan is to screen off part of the upper deck for him, as then he has the benefit of open-air treatment, and the risk of infecting others is reduced to a minimum. If that is impossible in the case of heavy weather, &c., the best means available must be adopted. He

may be kept in the sick bay, in one of the casemates, or a portion of the mess deck may be screened off for him. Precautions against infection, destruction of sputum, and sterilization of utensils, &c., used by him are of the utmost importance. The remedial agencies used will depend on the individual practice of various medical officers. Cases taking passage on H.M. ships from foreign to home hospitals are also treated on these lines.

In the naval hospitals treatment of pulmonary tuberculosis is carried out on moderate lines, and extremes like overfeeding are avoided. Cures cannot be effected, but cases are kept as long as practicable, to get the man as physically fit as possible before his discharge. The following is the general plan of treatment adopted at the R.N. Hospital, Chatham :—

A man sent in for observation for pulmonary tuberculosis is placed in a general ward where he is physically examined and his sputum frequently examined for tubercle bacilli. When tubercle bacilli are found he is transferred to the tuberculosis ward and is given the choice of being brought forward for survey and invalided at the earliest opportunity, or of receiving the benefit of three months' treatment.

A special ward is kept for these cases. It is well ventilated by the usual means, and the windows are kept wide open day and night, save only in gales of wind, when they are shut on the windward side. It is heated by radiators and stoves, and the temperature is kept as near 65° F. as possible.

The patients get a generous diet. They get the full diet of the hospital as follows :—

Bread .. ..	1 lb.	Soluble chocolate..	$\frac{1}{2}$ oz.
Beef, mutton, &c..	10 oz.	Cheese .. ..	1 oz.
Potatoes .. ..	8 oz.	Mustard, salt, vine-	
Other vegetables ..	6 oz.	gar and pepper as	
Tea .. ..	4 drams.	requisite	
Sugar (moist) ..	3 oz.	One rice or custard	
Milk .. ..	$\frac{1}{2}$ pint	pudding (1 oz. of	
Butter .. ..	1 $\frac{1}{2}$ oz.	rice or one egg,	
Oatmeal .. ..	1 oz.	$\frac{1}{2}$ oz. sugar and $\frac{1}{2}$	
		pint milk)	

In addition they get the following extras :—

Bacon .. ..	3 oz.
Milk .. ..	1 pint
Eggs .. ..	2
Calves foot jelly	$\frac{1}{2}$ bottle
Apples .. ..	2, or the equivalent in various
	fruits as they are in season.

They may choose beef, mutton, pork, fowl, rabbit, or fish for dinner, due regard being paid to the general routine of the hospital.

The usual remedial treatment is adopted, and they are allowed treatment by tuberculin if they wish it. They are encouraged to be in the open-air as much as possible, those who are unable to walk are wheeled out in chairs, and those confined to bed have their beds carried out in fine weather, a special part of the grounds being used for the purpose.

Tuberculous cases are not entirely segregated from the others, but they are not allowed to go to church, nor to attend concerts or other entertainments. In the grounds they must carry spitting bottles. Spitting bottles and other articles used by them are disinfected every morning and all refuse and unused food from the ward is destroyed by burning.

Treatment on these lines is carried out at the other naval hospitals. At Haslar, however, special wards have been built on sanatorium lines, and tuberculous patients are more completely separated from others.

#### THE DISPOSAL OF TUBERCULOUS CASES.

As has already been stated every case of pulmonary tuberculosis is invalided out of the service either at the first survey after his admission or after three months' treatment. He is brought forward for survey by the senior medical officer of the section, with the approval of the principal medical officer of the hospital. The Survey Board consists of a port captain, two senior medical officers from the hospital, and one medical officer (usually a fleet surgeon) from the ships or establishments. They survey him and invalid him out of the service. After the necessary papers have been signed he is discharged invalided and sent to his home.

Men on leaving are presented with a pocket spittoon and Form M 137, "General Directions to Consumptive Persons." The medical officer of the district is notified. Surveys take place once a month, but special surveys may be ordered.

Men about to be invalided, are instructed to apply for Insurance benefits for consumptives under the new Act, and the necessary correspondence is undertaken by the hospital authorities. This is got in hand as soon as possible after the patient's admission, that there may be no delay when the man is discharged.

Men who refuse sanatorium benefits are discharged to their homes on being invalided. Men who accept can be retained in hospital if they wish, provided there is no undue delay and that there is accommodation for them.

Men invalided abroad are sent to the home hospitals and again surveyed there.

Pensions and gratuities are considered by the Admiralty and depend on the length of service, and whether the disease is considered to be attributable to the Service or not.

#### CONCLUSION.

To conclude, while we must admit that pulmonary tuberculosis is still a very common disease in the Royal Navy, and one that causes great loss to the Service of men, often highly trained and valuable men, yet all indications go to prove that it is on the decrease, and that this decrease will be greater every year. The more careful examination of recruits, the early diagnosis and removal of foci of infection, and the greater resisting powers to infection produced by improved food and more hygienic surroundings must tell in the long run, and we can, I think, look forward with confidence to a time in the future when pulmonary tuberculosis will be one of the incidental diseases in the British Navy.





## Clinical and other Notes.

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### APPENDICITIS SIMULATED BY MALARIA.

By MAJOR W. H. BABINGTON.

*Royal Army Medical Corps.*

ONE day, about three years ago, as I was walking round the surgical ward at Cottonera, Malta, I noticed the chart of a patient's temperature which resembled malaria. On inquiry I was told that the patient had been admitted a few days before with abdominal symptoms pointing to appendicitis, and that, in consequence of the urgency of the symptoms, the abdomen was opened shortly after admission, but that no evidence of disease was found at the operation; the appendix was quite healthy, and the abdomen was closed without the appendix having been removed. The abdominal symptoms disappeared after this exploratory operation, but the patient continued to have an intermittent temperature. I thereupon examined his blood and found numerous benign tertian parasites. A few doses of quinine brought his fever quickly to an end.

On September 14, 1913, about 6.30 p.m., a patient, Private C., 2nd West Yorkshire Regiment, was brought from Oboti, where there is a small detachment guarding a Customs House on the Bojana River, to the field ambulance at Scutari. On admission he was groaning with pain in the abdomen. His brother said he had complained of headache for two days, and the day before admission he had pains in the stomach and vomited all day; his bowels did not act. Condition on admission: Patient did not seem to be fully conscious. Temperature 105° F., pulse 130. He complained of great pain in the abdomen and head. The abdominal walls were somewhat rigid, breathing was of the costo-abdominal type. He was unable to bear any pressure over the region of the appendix. Rectal examination caused considerable pain, but no localized tenderness could be found. Twenty-three ounces of urine were drawn off by a catheter, but the symptoms did not alter.

Knowing that this patient came from a malarious district, and remembering the previous case at Cottonera, I thought that the high temperature, 105° F., the intense headache and the mental clouding pointed to malaria rather than to an abdominal condition. I accordingly examined the blood and found numerous malaria rings. An intramuscular injection of quinine was given immediately. A leucocyte count was made to exclude the possibility of an intercurrent appendicitis; the white blood corpuscles numbered 8,000.

The after history was uneventful, but confirmed the diagnosis of malaria. The temperature fell to 100° F. on the morning of the second

day, rising to 105° F. on the third day ; it fell to normal twelve hours later, and remained normal afterwards.

A week after the patient had left the hospital, he was questioned regarding his illness. The symptoms which left most impression on his mind were the abdominal pain—he put his hand over his appendix region when describing it—the vomiting and the headache.

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## THE SUPPLY OF MEDICINES TO MILITARY HOSPITALS.

BY MAJOR H. V. PRYNNE.

*Royal Army Medical Corps.*

THE following article was written to suggest a method in which it is thought that the supply of medicines and materials to military hospitals could be carried out with enhanced economy and efficiency.

As we all know, the present system is that half-yearly in England, and yearly abroad, medicines are requisitioned on regulation forms. These returns are based on the expenditure of the previous period and on the amount of stock remaining. In addition, officers inform the officer in charge of the hospital concerning any special drugs or appliances they may need, and these requirements, if considered essential, are included in the general requisition, which in its turn is reviewed and revised in the offices through which it is forwarded, until final sanction is given at the War Office for the contractor or the Army Medical Stores to supply the articles remaining on the list.

When one considers the practical working of such a system, it appears to have the following drawbacks :—

Should any officer require a drug or appliance for a special case, authority must be obtained for local purchase or a supplementary requisition rendered. The latter course is objectionable, in that it multiplies correspondence, while the former procedure is only intended to cover special and urgent requirements, and is consequently strictly limited to such purposes by administrative officers. Cases, therefore, that would benefit by special treatment, unless such is urgent, have to be treated by drugs and appliances in stock at the time, or wait perhaps for months until the regulation method of requisition can be completed.

In all Army Medical Stores and dispensaries will be found supplies of obsolete or superseded drugs, often a variety of fancy articles in agreement with the views of individual officers. The disposal of such supplies is a difficult matter, and the cause of great expense to the Government, for if the drugs are likely to prove useful they must be retained to cumber the shelves and the returns until deterioration or supersession determines their fate.

The destruction of drugs, which in the first instance may have been

costly, is a cause of unnecessary expenditure, but must happen when supplies are obtained without reference to the immediate needs of the hour. A special drug is requisitioned, and once appearing on a return is repeated on a subsequent one, even though the occasion for its use may have ceased.

Or again, for one officer with a belief in a certain special drug a supply is obtained: This officer may leave the station, or the need for its use may pass, or possibly other officers may lack his faith, or the particular drug may be discredited or superseded by some other line of treatment; in any of such contingencies the stock will remain on the shelves, and figure as "remaining" until its deterioration allows of its destruction.

To take concrete examples of such happenings as I have enumerated, I have seen on the shelves of an Army Medical Store pounds of Warburg's tincture ordered at the instance of an individual officer in some period of special fever prevalence. With the cessation of the need or the transfer of the officer, the drug continued for years to load the shelves and encumber the returns of these particular stores.

Again, a stock of calcium iodide was requisitioned for one officer, and was received after many months. By the date of its receipt the name of the officer requiring it was forgotten, and the officer himself, having replaced it by some other treatment, never inquired for it when the annual supply of medicines reached the station. The same thing happened in the case of a requisition for carbolic gauze and vinum opii.

At headquarter stations with many out-stations and a number of officers such occurrences would be proportionately more frequent.

Any officer can multiply such instances indefinitely out of his own experience, and administrative officers cannot compel the expenditure of surplus drugs, but can only suggest to officers that they should use up such accumulations in place of employing other similar drugs and materials.

It might be argued that officers should acquaint themselves with the contents of Army Medical Stores, but that is merely to lay the onus of expenditure on each officer's memory.

Further, in the case of special drugs, as for instance, fluorescin as a means of diagnosing corneal ulceration, or for example, salvarsan for syphilis, administrative officers will hesitate to sign requisitions for every drug that individual officers may require—especially when, as in the case of 606, the drug and apparatus is both costly and still under trial, whereas he has an abundance of the drugs in more common use for the same condition.

Once accumulation occurs, the drugs and materials, however old and obsolete, must either be expended, or brought before a Board for condemnation. The destruction of such drugs and materials represents no light item of loss.

The present paper is an attempt to suggest a remedy for the foregoing defects.

If administrative officers could send their requisitions straight to the contractor, many of the disabilities of the present system would be removed. Routine requisitions could be sent once a month, and urgent requisitions supported by covering explanation, so that the cost of transport might be authorized. The saving effected on the reduced amount of deterioration could be set against any enhanced cost of transport entailed by the monthly dispatch of supplies.

The system would appear to have the following advantages:—

(1) Drugs would be demanded only as required, and in such quantities that, while ensuring a continuous supply, any harmful and undue accumulation would be obviated.

(2) Drugs and materials would be in every case fresh, so that deterioration would be reduced to a minimum.

(3) Returns would be much simplified.

(4) Stores and dispensaries would not be hampered with large amounts of useless and obsolete supplies.

(5) Drugs on trial would only be ordered in small amounts, and for special cases only, and in the case of unstable compounds this would tend to limit deterioration.

(6) There would be no delay in obtaining special, but not urgent, drugs or appliances for particular cases.

The Army Medical Stores, Woolwich, could take the place of the contractor, as far as was deemed advisable, and under similar conditions. The safeguarding of economy under such a scheme would lie in the monthly report to the War Office of all demands by administrative officers; therein would be shown all supplies received, expended and remaining, and the reasons for any special demands or unusual expenditure. The War Office could then at any time call the attention of an administrative officer to any demands considered excessive or unnecessary, or to the purchase of drugs locally when such could have been obtained in reasonable time by application to the contractor.

Even at stations abroad many drugs could be obtained direct from a contractor instead of purchased locally, but for the long delay entailed under the present system.

In distant stations like Hong Kong a greater latitude should be allowed for local purchase, as requisition on the contractor would entail a delay of months in any case.

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### AN IMPROVED CIRCULAR TYPE OF BRICK INCINERATOR FOR STANDING CAMPS.

BY STAFF-SERGEANT E. B. DEWBERRY.

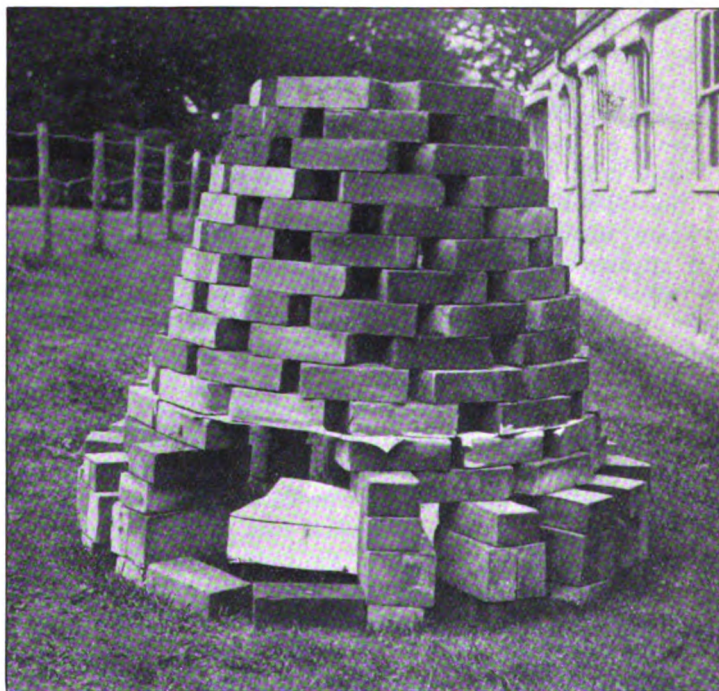
*Royal Army Medical Corps.*

THE design and method of constructing this incinerator are clearly shown in the illustrations.

The number of bricks required to build the incinerator is 184.

Its approximate dimensions are :—

Diameter of interior at top, 20 in. ; at base, 36 in. ; height, 46 in.

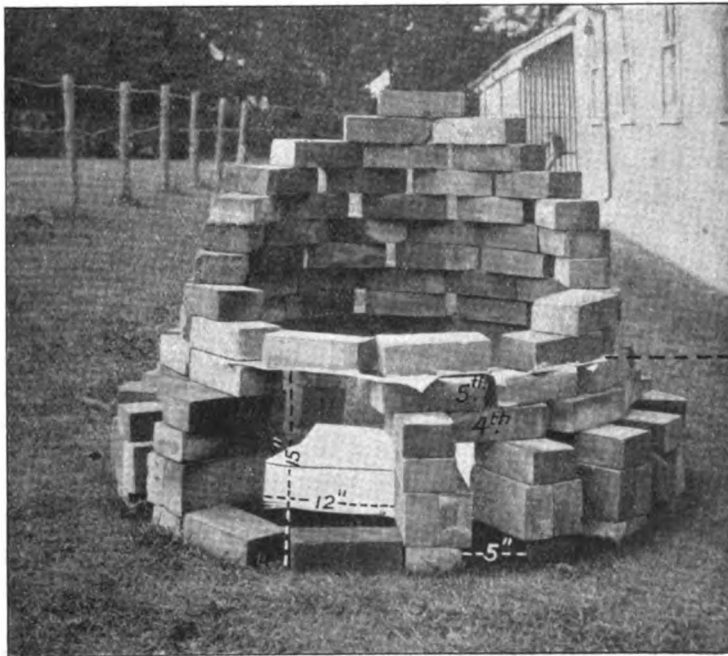
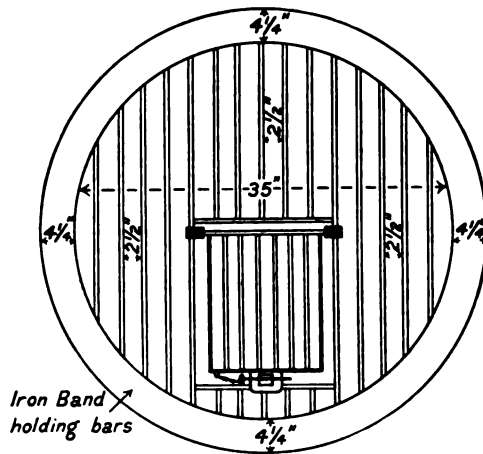


Height of bars from ground, 15 in. ; size of space between bars,  $2\frac{1}{2}$  in. ; size of opening at base, for clearing purposes, 12 in. ; width of space between bricks at base—outside, 5 in. ; inside, 3 in.

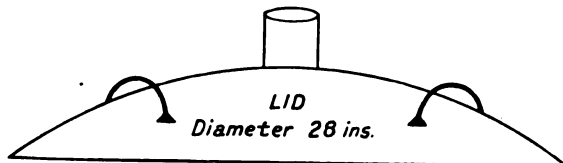
The above incinerator can be quickly and easily erected, and whatever the direction of the wind, a satisfactory draught is always ensured.

The cover need only be used in wet weather.

In constructing the incinerator the openings left between the bricks should, if possible, be in alternate rows, but the fourth and fifth rows



should be completely closed. The band holding the bars should be placed on the fifth row of bricks. The door in the bars can be let down when it is desired to empty the incinerator of any tins, &c.



The design can be easily adapted to local circumstances, and in very wet and windy weather the spaces left between the bricks can, if necessary, be closed up with clay on the weather side.

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### Echoes from the Past.

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#### ARMY MEDICAL ORGANIZATION IN WAR, WITH SUGGESTIONS AS TO MILITIA AND VOLUNTEER AID.<sup>1</sup>

BY SURGEON-MAJOR G. J. H. EVATT, M.D., A.M.D.

I PROPOSE in this paper discussing the subject of our medical organization in war, and to make certain suggestions as to its more efficient working, and further to lay down certain proposals as to the aid we should receive from the Militia and Volunteer services of this country in order to secure war success.

I trust you will allow me at the beginning of my paper to say how important a function this Institution fulfils, inasmuch as it allows an officer of any branch of the Service to come here and offer his suggestions as to weak points which, in his opinion, may exist in the Service; and how important, in my humble opinion, it is to encourage and not to stifle such expression of opinion, provided always the just demands of a fair discipline are satisfied.

The medical service is, in this respect of free expression of opinion, more handicapped certainly than the artillery or engineer corps, for these latter arms of the Service have their own corps journals, where an officer of any rank, senior or junior, may open

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<sup>1</sup> Reprint of a Lecture delivered at the Royal United Services Institution on January 18, 1884.

up, under his own name, the most vital or radical discussions as to his corps organization. We as yet have no such journal, and hence the officer who feels any changes desirable is forced to have recourse to other means of awakening public opinion far less weighty than signed papers.

In the first place I have to complain that—so far as my personal experience goes in the Service—the subject of military medical organization for war has received little study by military officers, and I can count on my fingers the number of officers I have met who fully appreciated the fact that they—that is, the purely executive officers of the Army—are to-day as absolutely responsible for medical war efficiency as for the efficiency of the artillery or any other branch of army service. Few great military leaders have disowned this responsibility; on the contrary, the more one studies the lives of the great soldiers of past centuries, the more one can see that, according to their lights and to the then prevailing views of preserving life from disease, those military leaders were quite ahead of the age they lived in, and they felt for their men an abundant sympathy in guarding them against breakdown from sickness, and, if sick, did as much as they could to make them comfortable. I complain that to-day, in our Army, I fail to find any general knowledge of medical war wants diffused through the Service; and that while the medical service is struggling to put itself into unison with modern war demands, it finds itself handicapped, and not supported by current military opinion.

That it should be so is very lamentable; but I blame the medical service for much of this apathy or ignorance, for we have not taught the Army as we should have done. Had we but explained to officer and soldier by lectures and demonstrations what our wants and aims were, we should have killed out opposition, and made partisans, instead of opponents, of the military officers. Influenced by such views as these, I ask to-day to be permitted to explain what the aims of the more recent medical changes in the Army were, and why we have broken with the past organization of the medical service.

To understand the present system, I must ask you to go back with me thirty years to 1853, and the year that succeeded it, and see what was the then method of working the medical service in war. Let us take the army that embarked for the Crimean campaign as our example, and see how we were then situated as regards the war system of the medical service.

The medical service then consisted of a grouping of medical



officers, commissioned by fours, threes, or singly, to every battalion or battery. These officers wore the regimental uniform, were under the command of the battalion commander, and administered their regimental or battalion hospitals under the control and on the responsibility of the military commander of each unit.

In every garrison there were a series of small battalion, regimental, or battery hospitals, each entirely distinct and separate, where the sick of each battery or battalion was treated by its own battalion or battery doctor.

The nursing was done by a regimental hospital serjeant and a certain number of privates of each battalion who were placed by the commanding officer for duty in the wards.

The hospital serjeant was the executive agent of the military commander to maintain discipline in the hospital, and to see that the medical officer's orders were carried out, for the army surgeon himself had no definite power of command over either serjeant, orderlies, or patients, but referred all questions of the kind to the military commander. If a regimental surgeon went sick or went on leave, a staff doctor, of which there were some sixty or seventy in the Service, was employed in filling up the sick man's place; but still the same system went on, and the staff doctor was simply the *locum tenens* of the absent man.

For every detail of work in the regimental hospital the officer commanding the regiment was officially responsible, save only and except medical treatment. The discipline was done by the colonel; orders were issued by the adjutant; the quartermaster did the transport and stores work, and the orderlies of the battalion did the nursing.

There were not in England in 1854 more than three, if so many, general hospitals; all the sick were subdivided in each garrison into small groups of regimental hospitals. An Army Corps consists, as you all know, of about forty-seven units, divided into divisions, brigades, and corps troops. When the army went to the Eastern campaign, the Army Corps had with each of the forty-seven units a hospital varying in size according to the size of the unit. Whatever size the hospitals were, they were purely regimental; the doctors wore the regimental uniform, and no authority existed for moving them from their battalions, or, if they were moved, no power existed to move the serjeants and nursing orderlies—men quite as important in their way as the doctors themselves.

This is what is everywhere called the regimental system, and in 1854 it was put to the test by actual war. An army exists for war;

if it fulfils that function, it is good, if it fails in that duty, then however successful as a social organization, however pleasant as a centre of comradeship, however full of interest and romance it may be, it is a sham, and had better be cleared away. I maintain that the then organization of the medical service was, as far as a military war service is concerned, a sham. Measured by the war test it was a failure; why, we shall now proceed to discover.

Whatever the old-fashioned campaigns of last century were, with their easy marches, their slow manœuvring, their retirement for six or eight months of each year into winter cantonments, war is to-day a different thing. To-day rapidity of movement is a distinct factor in military success. The army that unencumbered can rapidly strike a blow at the enemy, is the army that has many points in its favour in the game of victory. I say now that any army which attempts in modern war to carry forward with it its sick and wounded men, a principle implied by the regimental hospital, is doomed to failure. The heaviest burden, the most killing weight an army ever carried with it, is the sick and wounded man, and how to get rid of him is really the keynote of all modern medical organization in every country.

Let us, returning to the Eastern Army of 1854, see how with its then medical organization it fulfilled the demands of modern war. Take its ambulance system on the field; go to the hillside of the Alma on the evening of September 20, 1854, and see how it worked there. The total of regimental army doctors and of regimental orderlies with the Army Corps that took part in the fight that day was ample and sufficient under better organization to have done well by the comparatively few wounded.

There was no attempt at ambulance organization. The battalion surgeons of the regiments under fire, aided by the bandmen, carried away, or tried to carry away, the battalion wounded. There were no trained regimental bearers, no bearer-companies, no field hospitals, no ambulances, no hospital corps, no equipped hospital ships, and behind all was the chaos of Scutari with its "dreary corridors of pain."

I will ask you to put yourself in the place of the battalion surgeon of September, 1854, as he stood that night on the hillside of the Alma, and saw his friends and comrades lying on the ground with none to help them, no ambulances to carry them, no hospital corps to nurse them, the bare 'tween decks of the empty transport to be their hospital ships, and trusting to the sailors of the fleet for the hammocks they used as stretchers to carry them to their ships.

I will ask you to think of Thomson of the 44th Regiment left on that battlefield with 400 wounded Russians with no attendant save his soldier servant, and say was it possible for us to stand by so fatal a system.

The faults I find with the system of 1854-55 are as follows :— In the first place, by keeping the sick of the army in a great number of small regimental hospitals in a garrison you effectually paralyse all real professional progress amongst the doctors. It is almost impossible for the small experience of a battery or single regimental hospital in peace to give a large field for medical study, and owing to the isolation of the doctors that intellectual friction which in the end produces progress, is not developed. Secondly, as regards nursing, if you make your nursing orderlies merely chance men taken from the regiment, you cannot develop a body of trained nurses who will stand by that special line and give their whole heart to it. Remember that in a regimental hospital the only post for a non-commissioned officer was the one of hospital serjeant, and no intelligent private man will come if he is to remain always a private. In developing nursing then the old system failed to provide the best.

As regards hospital administration again it failed, because to make a great hospital work, you must be trained in great hospitals. Just as you cannot practise brigade movements with a corporal's guard, so you cannot make a doctor, trained in a small hospital with one hospital serjeant and a few orderlies and some twenty or thirty patients, rise suddenly to the power of administering and controlling great war hospitals with hundreds of sick. He is paralysed and overwhelmed by the responsibility, and as by having battalion hospitals you kill out your need of a hospital corps, when war comes you are left without subordinates, and have to fall back on the scratch teams of drunken pensioners of 1854-55. But if you do this your patients die, and your hospitals break down and become the byword of the century.

Again, if you attach your medical men by threes and fours to battalions and render them immobile, then when you go on a campaign or into a fight, if one corps is burdened with sick or wounded and another corps is fit and well, you overwork your doctors in the sickly corps, while the doctors of the unengaged and healthy regiments remain idle.

So it was at the Alma, the whole of the doctors of the battalions of the divisions not under fire were quite idle, but an overwhelming labour rested on the doctors of the engaged battalions. You are

forced *nolens volens* to fall back on a larger unit than the battalion, and you come as all armies come in the end, to the divisional unit. But if you are to keep your soldiers in good *morale*, you must let them see that if wounded in the fight aid is ready to hand. I do not call it aid to take the bandmen and make them dressers of wounded. The band itself as music is an aid, and an important aid, to men in the day of battle, and to break it up is to handicap yourself against success. You must have trained bearers able to check bleeding and to afford real aid to the suffering; bandmen never could do this. But beside these regimental bearers, you need to have, for the same reasons as for the doctors, some larger unit than the regimental ambulance help; that is essential and valuable, but it is insufficient. The battalion doctor cannot carry chloroform in any quantity, nor cooking-pots for the all-important soup, nor brandy enough for many wounded, nor operating tables and instruments demanded by modern surgery; and you need some help between the battalion surgeon and the field hospital farther in the rear, and that help is the admirable bearer company, of which I shall speak directly.

But if we go a step further, we come to the climax of the subject, and that is, that you cannot in war have a regimental hospital for seriously sick or wounded men. In the first place, if a division is told off for an attack, one brigade is sure to suffer more than the other, for one is in support and one is in reserve. This means more wounded in one brigade than the other, and you need some power of equalizing the work, or the sick of the first brigade will be neglected, while the doctors of the second will be idle; and so you lead back again to the field hospital common to the whole division.

But say that we have regimental hospitals, and that the twelve regimental hospitals of a division have all a fair proportion of sick and wounded, and the division is to march forward, what becomes of the sick? If you take them with you, you will certainly be beaten by the enemy, for you will be creeping along, encumbered with vast trains of sick and wounded, and that certainly is not war; while if you leave the regimental hospitals behind, you advance without any medical aid.

And think, too, of the doctor and the scratch hospital left behind! You have during peace deprived him of all power of command over his subordinates, the Colonel had the discipline, the Adjutant issued the orders, the Quartermaster did the transport and the rationing, and, lo! all are now marched on, and the unfortunate doctor, who has been taught never to take any initiative, is now suddenly to

become Commander, Adjutant, Quartermaster, and Transport Officer all in one. It is not possible ; so slowly we work back again to a series of divisional hospitals, with their own nurses, their own Quartermasters, their own Transport, and controlled by doctors trained in peace to direct and manage their own hospitals in war.

Let us again turn and see what was the end of this Crimean chaos, for you must remember that although the Crimean and Scutari were great troubles, the Crimean campaign was not really a war trial at all. War means movement, and the Crimean Army never moved ; practically it marched to the heights above Sebastopol, and there it dug itself in, it huddled itself, and there it remained until the town fell. Such wars are rare. It was really a great case of sitting out, and not fighting, and anyone can see that if transport troubles and hospital troubles beset the sitting army that lay in front of Sebastopol, how far more heavily the same troubles would have fallen upon that army if a long line of advance into the Russian interior had taken place, and a line of communication had required to be held.

But public opinion demanded a full inquiry into the Crimean medical experiences, and in 1857 and 1858 Sydney Herbert's Commission sat and introduced a number of improvements, but it still made no radical change, and it really made war efficiency little less within the range of practical achievement than it was before the war of 1854-55. It gave the doctors rank and pay. It founded the germ of a hospital corps ; it developed a kind of hospital commissariat ; it formed two general hospitals, supposed to be training schools for war work ; but it still stood by the fatal error of maintaining the regimental hospital and the regimental doctors in peace, and that really killed out all the other advantages.

As I have said previously, if you keep up regimental hospitals, you paralyse our training for war, and if you take all control out of the doctor's hands in peace, and make some one else responsible, you develop a body of weak-kneed men, who, when war comes, stand paralysed by its demands on their energy.

To Lord Herbert we owe much, and his name will never be forgotten by the medical Officers, or by that great profession of which they are but the war section. But our debt to him is more that he recognized our sanitary duties in preventing disease than for any real advance in war organization. The Corps of orderlies he founded was not linked to us in title or control or sympathy. Of the two general hospitals he founded, the one which bears his name was never anything but a series of regimental hospitals

thrown confusedly together, and Netley is a great school, with a permanent staff who do not go to war. The purveyors, who were intended to be our assistants and our agents, became in the end quite independent of us, and the ambulance relief to soldiers on the field was so badly dealt with that, at the Committee on Army Transport in 1866, a very pretty discussion arose between the then Director-General of the Medical Service, the Chief Purveyor, and the Chief of the Transport Service as to who was really responsible for removing the wounded off the field. Nobody knew who was responsible even in 1866.

But the great means of securing progress in our medical service were the war of the Rebellion in America, the campaign of Sadowa, and the disasters of Sedan and its sequences. We began to study foreign systems more and more, and in 1873 and subsequent years we have developed and are developing a new system, which I think will stand scrutiny alike by the scientific soldier, the humanitarian, and the physician.

The scheme of unification now slowly making progress in our Army was introduced in March, 1873, further developed in 1876, and in 1877 it received a still further development. It is still, however, in its infancy, and when you remember what time it takes in England to introduce any change, I think we have not done badly.

In 1873 the medical Officers were removed from the various regiments in which they were commissioned, and the staff and regimental doctors were unified into the Army Medical Department.

Regimental hospitals as distinct units in each garrison were abolished and replaced by central garrison hospitals. The Army Hospital Corps was developed from its previous scattered condition into a strong corps doing all hospital duties, and the medical Officers were made responsible for the management and control of their hospitals in peace and war.

Gradually a body of fifty-two Quartermasters were developed who were to have charge of the subsidiary duties of storekeeper and paymaster of the hospitals, and in 1877 the command of the Hospital Corps was given over to the doctors.

But what interests us most is the war scheme of the 1873 organization.

Firstly, the three or four doctors of each battalion were replaced by one medical Officer who is posted to the unit, be it battery, battalion or regiment, at the outbreak of the campaign, and who remains with it throughout the war. If he gets sick or wounded he

is replaced at once from the divisional doctors. In war, sickness is rife, wounds are frequent, battalions are up to war strength, and there is full employment for a medical man, and further he is a great aid to *moral*, and has had to do sanitary duties also. In peace it is not so. Batteries are absurdly weak, and battalions mere skeletons waiting for reserve men to fill them up in war. A medical man posted to so small a charge would probably come to grief from need of work.

In war time, however, besides the battalion surgeon there is now a body of regimental stretcher bearers, sixteen men trained to ambulance work who assist the surgeon in giving first aid on the field. The band keeps to its music, and a distinct body of men is told off for the wounded. This surgeon has also with him medicine boxes containing portable medicines and first dressings, but there is no battalion or battery hospital.

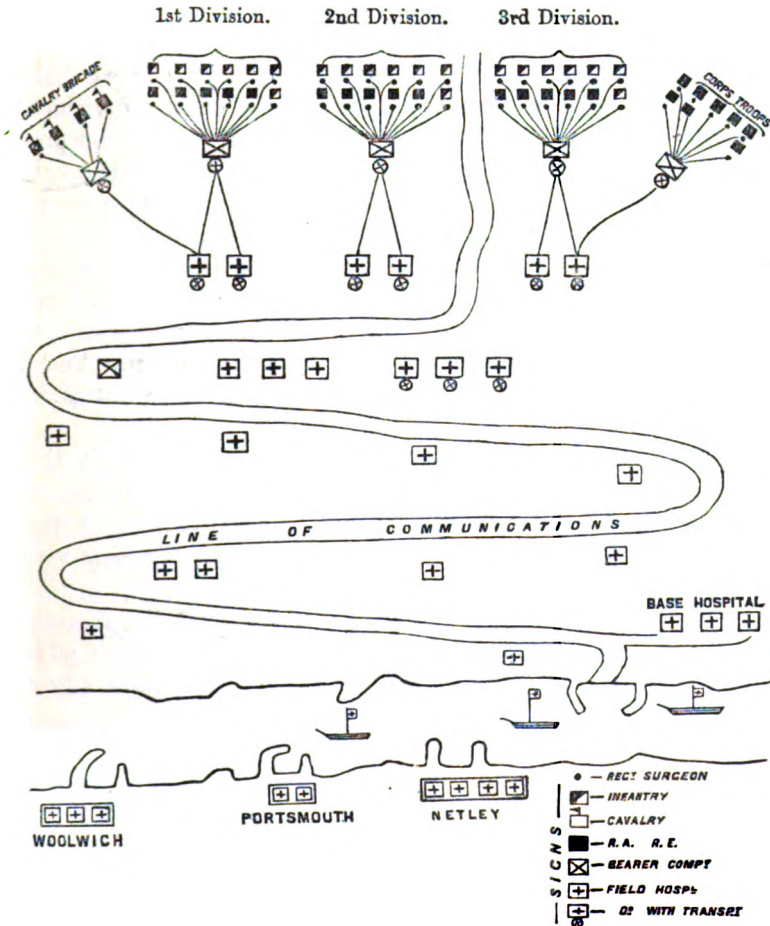
If a man be sick or wounded he is sent to one of the field hospitals of the division.

If you look at the Diagram on the wall you see at a glance the existing medical system for an army corps in the field. There are forty-seven units in the army corps, and there are forty-seven surgeons with those units. There are in addition forty-seven detachments of regimental bearers.

But an entirely new organization now intervenes, that is the bearer company. Of these there are four with an army corps, viz., one with each of the three divisions, and the fourth is divided into half companies, one half with the cavalry brigade, and one half with the corps troops. I claim for the bearer company that it is the very best and most useful outcome of modern humanity in dealing with the wounded in war. No one can see it at work at Aldershot without recognizing at once its eminently practical character, and what an enormous boon it is to the soldier in war. It seems to me a great pity that it should be working at Aldershot in remote parts of the camp by itself, and not taking part in every field day, and not at Aldershot alone, but at every great military centre where soldiers can be mustered. Its work is most realistic, most thorough, and I feel absolutely certain it only needs to be seen to be appreciated.

In war time this company consists of eight medical Officers and some 200 Army Hospital Corps and Transport men who have with them surgery wagons containing an elaborate supply of instruments, operating tables and dressing supplies, cooking-pots for soup, brandy, various stimulants and suitable refreshment for the wounded, and ambulance wagons thirty-three in number for the removal of

wounded. This bearer-company can break into two half bearer-companies, and it is believed that Lord Morley's Committee will separate them definitely into distinct companies. It is merely a question of detail. What is the function of these companies? When a man is hit say in the 1st Battalion, 1st Brigade, 1st Division,



the battalion bearers carry him to the regimental surgeon, who stops bleeding and applies a hasty first application to the wound, giving water or brandy if possible. The wounded man is then carried to the rear until he meets the ambulance wagons of the bearer-company and the Army Hospital Corps bearers. He is then



taken over from the regimental men and conveyed to the dressing station of the bearer-company. This is the regularly equipped spot chosen by the bearer-company to collect all the divisional wounded. Here the wounded man is examined by the operating surgeon, operated upon, thoroughly dressed, fed with soup, wine, &c., and finally passed back by the ambulance wagons to the field hospitals, which must be always farther in the rear, and to reach which might cause great delay.

The bearer-company dressing station is really a very light advanced hospital, and a great collecting place of the divisional wounded, who may sometimes remain there until the field hospital is able to make its way through the crowded roads behind the fight and be pitched over the wounded. All this collection and removal of wounded, and pitching and arranging the dressing station is a drill, a distinct technical drill which needs to be practised and learned just like any other technical drill. The great pity seems to me to be that it is not done with the Army at every field day, so that the Army might see and learn what they now do not know, that is, what a bearer-company is, how it works, and what is its organization.

I hope that one day Generals will arise who will study this company and see if it be not really what I claim it to be, an admirable organization and most essential to the Service. A few such companies at the Alma might have shortened the war very much, and have saved many valuable lives.

In Egypt, as you know, Lord Wolseley stated that the removal of the wounded was well done, and if it were known with what extreme difficulty the companies got their needful transport, all the world would say that the doctors had done well there.

When the bearer-company has handed over the wounded to the field hospitals, it again advances with the advancing army and resumes its place with its division.

It is still a young creation, slowly developing itself, but its future is absolutely assured. In our future wars it will be the most honoured and valued unit in the Army.

We now come to the field hospital. We saw that in 1854-55, with an army corps we had forty-seven regimental hospitals, fragile creations without trained nurses, without their own Quartermasters, and completely organized to break down when left behind by the advancing regiment.

These forty-seven fair-weather yachts that perished in the storms of war have been replaced by twenty-five field hospitals,

complete units in themselves. Every army corps of 36,000 men has now in war these twenty-five field hospitals, each supposed to be ready to nurse, feed, and treat 200 wounded or sick men. Their equipment is packed in special wagons, they have abundant drugs, instruments, blankets, cooking and feeding requisites, and are as mobile as a battery of artillery. There are seven doctors to each hospital, one Quartermaster of the Army Hospital Corps, but alas! only thirty-seven hospital corps subordinates. Of this more by-and-by.

These twenty-five hospitals are posted, as you can see by the diagram, two to each division, making six, six more in reserve behind the front of the army, and thirteen along the lines of communication and at the base. When an action is fought, the wounded are taken first to the dressing station and thence to the field hospitals of the division, these being filled, halt upon the battle ground, and two more hospitals out of the reserve are posted to the division, which is again able to advance with its bearer-companies and field hospitals ready for another fight. The sick and wounded in the halted field hospitals, if they recover, rejoin their battalions, if they get worse or are seriously hurt they pass back along the lines of communication from hospital to hospital to the base hospitals. Here they remain, and if they recover, rejoin their battalions; or if still ill, return to England in those well-found floating hotels called hospital ships which have now replaced the comfortless transports of our old wars. We have now, as you see, a definite system, and we know how we stand. We never knew it before, and success is sure to come to us if we work on these lines, which are themselves merely adaptations of the German system. We can tell exactly how a soldier ought to be cared for, and this was impossible in the confused old days. I do not claim for this system perfection in detail, for it has unfortunately many defects; but its principle is, I think, absolutely true, and no soldier can find fault with it on that ground. The fact is that the medical service is striving to force upon the Army a system of war organization framed to assist the fighting soldier in achieving war success, and as yet the average soldier does not see it. It only needs education to perceive its great advantages over past systems. As it gives a more decided field for medical energy and power of work, so it demands more labour from the medical Officers to work it, but it is entirely the interest of the Army that the medical Officers should have free scope to do good work. There is ample work for both classes of Officers. In the purely military line much has to be

done by the pure soldier to teach his men the very great and urgent demands of modern military knowledge. Leave to us the hospitals and we will learn to make them perfect, and it will in the end be for the best.

One of Lord Morley's Commission wished to have the doctors again posted to battalions in order that they might learn to obey and learn to command. This is in truth quite what the old system never taught any army doctor. Having two masters, viz., the principal medical Officer and the regimental commander, we played off one against the other, and certainly did not obey either very much.

As to command, when did a battalion surgeon ever learn to command? Why, every rule and regulation was framed to paralyse all such acts. An old regimental surgeon never gave an order to any man, and as the Army rules reared him, so he grew up, and then having first deprived him of all power, he was expected in war to rise and do wonders on his own account.

It is not in such ways that men are trained for accepting responsibility. We are now on a better path, and shall no doubt make further progress.

I will now ask you to agree with me that field hospitals are needful, and should be efficient for the work they are called on to do.

I regret to say that manned as they are to-day it is absolutely impossible for them to do good work; nay, indeed, to work at all. But the remedy is easy, and very simple.

To nurse 200 sick men in a war hospital is a heavy task. It is not so in a peace hospital, for in peace many patients are trivially ill, and many are convalescent.

In war few of either are to be found in field hospitals. Trivial cases do not come to war hospitals, and convalescents are generally in a depôt near the base. At any rate, the general average of war patients are far more severe than peace patients. Now in peace we get one orderly to ten patients, and in war one to nine. It is completely insufficient. Naval hospitals get one per  $7\frac{1}{2}$  patients, and we all say that one per five sick is needed for war. That would require forty orderlies to nurse 200 sick men. But if you look at the following table you will find that it gives only twenty-two for the purpose.

This allowance of thirty-seven men is completely insufficient to do good work. If you want nursing well done you must have rest and fair reliefs. Twenty-two men cannot nurse 200 with anything

like thorough work. Increase it to forty per 200, or one per five sick, and the machine will work. If you read the Report of Lord Morley's Committee you will see in every page evidence of complete overwork of the nursing orderlies; so if in the next campaign we are to do good work we must have men given us to do it. Take again the cooks; six are allowed for 200 men, and that cooking for the sick is very trying, for there are many dishes to be made separately, and also much has to be cut up in small portions. We need eight cooks, or two per fifty sick.

ESTABLISHMENT OF AN ENGLISH FIELD HOSPITAL FOR 200 BEDS.

Steward .. .. .	1
Assistant .. .. .	1
Wardmasters .. .. .	2
Compounders .. .. .	2
Storekeepers .. .. .	2
Clerk .. .. .	1
Cooks .. .. .	6
Nursing orderlies .. .. .	22
Total .. .. .	37

Again, as to clerks, if we are to keep regiments informed of where their men are, we need a clerk to do it, and we have only one man to keep all the records and carry on the large correspondence. We need at least four clerks for the 200-bed hospital, so that if 100 beds are detached there may be two clerks for it. But the gravest cause of overwork and threatened breakdown is the complete absence of the coarser assistance needed in a war hospital.

I have placed here a comparative table (see p. 102) of an Indian and an English war hospital for 200 beds, and you will see the difference at once.

In an English field hospital there is not one man allowed to carry water for the hospital. This is the most killing want, as it goes at the root of all cleanliness, and if I am to get water to my hospital I must have men to do it. You do not ask a battery commander to work his guns with half the proper number necessary for the work. Why ask me to work a field hospital on such conditions?

We want this question to be dealt with before our next campaign, for we shall certainly go to grief if we do not get men to do this work. We are asked to do impossibilities, and we only ask that these questions be looked into to see that no man, however energetic, can work under such a handicap.

COMPARISON OF THE PERSONNEL OF A 200-BED FIELD HOSPITAL ON THE ENGLISH AND INDIAN SCALES.

Class of servant	English scale	Indian	Proposed
Compounders .. .. .	2	4	4
Wardmasters or dressers .. ..	2	8	4
Nursing orderlies .. .. .	22	29	40
Clerks .. .. .	1	1	4
Storekeepers (and Stewards) .. ..	4	7	5
Cooks .. .. .	6	9	8
Dispensary servants .. .. .	0	8	0
Watermen .. .. .	0	15	8
Washermen .. .. .	0	5	8
Sanitary police (sweepers) .. ..	0	23	8
Messengers .. .. .	0	1	4
Carpenters .. .. .	0	1	0
Tent-pitchers .. .. .	0	10	0
Barber .. .. .	0	1	0
Total for 1 hospital .. .. .	37	122	93
Total for the 25 hospitals of an Army Corps	925	3,050	2,325

We want at least eight fatigue men to supply water for the hospital. This will give two men for each fifty sick. When we consider the number of baths, the washing in and about a hospital, it is seen at once that many men are needed.

Again, as to conservancy or sanitary police. In peace we have admirable drains to carry away all sewage from our hospital, but in war we have nothing of the kind, and in a hospital camp in war these men are much needed. In fact, it is deadly to the hospital not having them. I say again, you are asking us to do impossibilities. You are asking us to make bricks not only without straw, but without clay, and we cannot do it. You are asking us to toil as we do in war like slaves at the coarsest menial work, and yet you give us no men to act as pioneers and to keep the place healthy and clean. When the need comes in great moments of trial there is no work I will not do for the sick man, but it is quite another affair to embark from this country on a campaign and to know that no proper provision is made for this all-important work. Again, as to washing, we have not a single man given us to wash the clothes, and yet we are blamed if the clothes are not clean.

We have, then, to appeal against this want of forethought which hurries us to war without the necessary means of doing good work, and while we are continually urged to be professional, no one is given us to carry water, to act as sanitary cleansers, or to wash patients' clothes. Again, as to messengers, if I want to send a note

to a regiment or to an Officer close by my camp, I have no orderly or messenger, and as a consequence I must take a nursing orderly already overworked to do messenger duty, and so neglect of the sick occurs.

You see then by the scale I have drawn up that thirty-seven men are completely insufficient to work our field hospitals in war, and that ninety-three men are not only not too much, but barely enough to make a hospital work. You can now see how legitimate are our complaints, and how heartbreaking it is to go into the field with a unit completely organized for failure.

If England, or the Army, demands that her soldiers be cared for in war, it will not do for her to develop a flash of warmheartedness when a campaign occurs, and accuse her doctors of want of sympathy and neglect. England has her duty to perform, and that is to listen in peace to the fair and just demands of her doctors, and as far as they be legitimate to grant them. Thus, and thus only, can war efficiency come. Nor do we in any way absolve the military commanders of their responsibility. Command has its duties as well as its rights, and one of its duties, as high as any, is to see that, before going on a campaign, the just demands of the medical service are met. You must not in all these matters legislate on the basis of heroism and self-sacrifice. The sentry at the outposts keeps vigilant not from self-sacrifice, but because he is regularly relieved, and so with our service. You must not draw up codes for saints and angels, but for average men, who get tired if overworked, get hungry if not properly fed, and who feel bitter in their heart if treated unfairly. These are points which are not fully dealt with in Lord Morley's Committee, but they are as true as anything can be, and no Officer I have spoken to on the subject can deny their truth. We need, then, large reserves for war, and I will, in a few minutes, when concluding this paper, show how they can be obtained.

Again, take another point. Where are our field hospitals at the present moment? They are entombed in Woolwich Arsenal, and until the Egyptian campaign no one ever saw one taken out of store. The Officers who saw them in use in Egypt saw them then for the first time, and no wonder that difficulty occurred as to the character of their equipment. In my opinion they should be taken out of the store-room, and posted to each divisional centre, and then the Army and ourselves would see what they are like, and find fault with them if necessary in peace, so that when war comes they may be efficient. This is the way the artillery is efficient. The

battery commander does not read about his battery only, or hear that it is in a store-room in Woolwich Arsenal. He has his guns with him, and hence he is accustomed to them, and he and his men know how to work them. Give us and our men an equal chance. Let us have a month every year and practise our field work with the Army.

But, again, take another point. We have a Chief Medical Officer, a Deputy-Surgeon-General, who is responsible for the medical arrangements of the twelve regiments in the division, for the bearer-company, and for at least two field hospitals. Every soldier knows what an immense amount of correspondence this involves and what an anxious position the post is. Yet while the artillery commander and the Royal Engineer of the division have both Officer assistants as Adjutants, our divisional chief has no one whatever to assist him, and he is in consequence completely overburdened with detail work and formal correspondence. I could tell stories of the result of this state of affairs in the field which would be laughable were they not really sad in their results on war efficiency. The remedy for this is not difficult; it is to give the divisional principal medical Officer a junior medical Officer as his secretary or Adjutant or personal assistant.

The attention of the Army should also be drawn to another very urgent detail of our war system, I mean the relations which should exist between the Army commander in the field and the chief medical Officer serving with him. I maintain that it is entirely in the interest of the Service and of the nation that rules of the clearest kind should be laid down by the Secretary of War, defining the relations of both these officials. All will agree, I think, that intimate and confidential relations should exist between them.

A new theory, however, is now being advanced that the Surgeon-General with an Army in the field is not to be considered as the General's Staff Officer, but simply as the head of a subsidiary department, on a par with the smallest and least important branch of the Service. This is not the history of successful campaigns. We think it a highly injurious idea that would deny to the Chief Surgeon of the Army the status of a confidential Staff Officer of the chief commander. If you so cut off our chief from personal and continuous contact with the General, it will react on the whole of the medical service in the field, and we shall feel that he is not in the confidence of the Army commander, and that there is no one to be spokesman of our needs, and of the wants of the sick at headquarters. Such a condition of affairs will paralyse our energies, and injure our *esprit de corps*.

To-day, we need above all things definiteness as to our position. Either we should be accepted wholly by the Army, or we should be set wholly free from it, and allowed to work altogether under our own responsible chiefs as a distinct and separate department of the State. We can succeed perfectly under either conditions, but we cannot exist at all if we be indefinitely dealt with, if we are to be in the Army but not of it; to be blamed for failure in war, but left unconsidered in peace; to be thrown over for want of success, yet not listened to in our cry for assistance; to be held down by the bonds of military discipline, yet denied military rights and privileges; to be required to share in all the risks and hardships of field service, yet denied the share of the glory of victory; then, despite pay however remunerative, and rank however high, we shall fail England in the hour of her need.

We read military history, and we gauge very thoroughly our value in the military machine. We recognize the bravery of the soldier and the devotion of the Officer, and we estimate perfectly the efficiency for war work of the battalion and the battery. But we also know well why and where your armies have failed. They have failed in what are called the Departments, that is to say in the Commissariat, in the Transport, and in the Medical services, and it is for the Army to say if it shall always be so.

It most certainly will always be so until one day a great leader arises who, reading the signs of the times aright and grasping completely the spirit of the age, sees that you must crush out with a firm hand all inequalities in the treatment of the various classes of Officers in the Service, and make every man in the Army from highest to lowest, feel that all are working for the same end—the military success of the nation, and that the victory achieved by the Army is his victory, and its failure is his disgrace.

These seem to me to be the only lines on which to-day an Army in England can be successfully worked, and there is no reason whatever why they should not be made the rule.

If they cannot be made the guiding principle for the Army, at any rate set the medical service free from the military administration, and we will organize as the "Red Cross" societies organize, and build up under the Government a Medical Department for civil and military duties alike, and will send into the field a contingent of medical aid organized under its own chiefs, to be completely responsible for its own failure, and completely rewarded for its own success.

There is another very important question for us in war, and that



is the commissariat question. Certain reformers of Lord Herbert's school maintain that we should have our own commissariat in the shape of a distinct Purveyor's Department. We are, I suppose, to free the general Army commissariat from all responsibilities for feeding the sick, and we, a weak, poorly-manned department, are to develop a rival commissariat for ourselves and let the greater commissariat go free. Now apply this principle to the Egyptian campaign. Let us remember that 583 per 1,000—that is nearly six men out of every ten in the Army—went sick during that brief campaign. Are we, out of our weak establishments, to feed, and that, too, daintily, six men out of every ten in the Army? But when we remember that the Army commissariat did not succeed in feeding the Army very successfully, with all its large establishments and masses of trained subordinates, it is hardly to be expected that we would succeed with our infinitesimally smaller commissariat section. In my opinion we should do nothing of the kind. We should hold on tightly to the principle that the General of the Army is responsible for the feeding of his men, sick or well. That if he goes to war, he should first of all think out how his men are to be provided with food, and that the sick soldier has a distinct claim on the general Army commissariat; and just as you post junior commissariat Officers to the commissariat charge of brigades and divisions, so you should, when a war is imminent, post commissariat Officers to the base hospital and to the various units of the medical service, and it shall be their business to provide such food and supplies as the medical men need for their sick. If this cannot be done, and we are to have our own separate commissariat department to ration our own 583 sick per 1,000 of the Army, we might as well simply undertake to ration also the odd men remaining out of hospital! An army with a poor defective commissariat service is really no army at all. It is certainly not a war engine, and no General has a claim to such a title who does not see before a war begins that this all-important service will not break down.

Again, as to transport, we want a clearly defined transport allowance given to us. We should have a small section of purely medical corps transport; that is to say, enough to move our hospital wagons, and enough to horse the ambulances of the bearer-companies. This transport should be wholly our own, but be available for all camp duties when not specially needed for hospital service.

In our Army the question of transport has always been one of considerable concern, because, as it seems to me, it has been little studied in peace. With numbers of civilians trained and accustomed

in peace to look after horses, we have, as yet, no militia transport corps. Yet I feel confident that one could embody, either from the militia reserve or by direct enlistment from the peasantry, several thousand transport militia men accustomed daily to the care and driving of horses. Why not adopt such a course and apply to the great supply services the principles already existing in the other branches of the combatant service?

We have a reserve of Officers, why not call upon them to train themselves for commissariat and transport duties as well as for the duties of the front line of the Army? As to the horses, an army reserve of horses is as easily formed as an army reserve of men, if only somebody takes up the question and sees it through.

As to our medical transport, we need only be told whether we are to look for it to the Army or not. If the Army says no, and if we are allowed to appeal to England for men and horses, we can get the best of both to come and help us.

But I think a militia transport service, and indeed also a militia commissariat corps of civil butchers and bakers, is as easily formed as a militia artillery regiment. If, as is often said, the Army is to be part of the nation, the more we weld together the Army and the people, the better for our war success.

Every hospital embarking for war should march down to the beach with its wagons, its horses, its drivers, its equipment, and its medical staff as complete as a battery of artillery is complete, and so disembark in the enemy's country. This was the aim of the medical reform party, and this aim will surely be realized as time goes on.

Again, at the base of operations we need some body of men who will do the unloading of the hospital ships and medical transports, and who will move the sick from the great base hospitals to the ships and the railways. For this work we have no one now detailed, and you may read in Lord Morley's Report that, while the few nursing orderlies were engaged nursing all day in the hospital, they were waiting all night at the station, to convey and carry by hand the sick to the hospital. If anybody imagines that you can thus work your men and yet make the hospital work with accuracy, they are entirely mistaken. I would suggest, then, half a bearer-company be posted at the base of operations for this special duty. You should also have for your lines of communication two or more bearer-companies for use as sick convoys, either to man the ambulance trains conveying the sick from the front, or to transport and care for the sick proceeding to the base by road convoys in wagons.

There is one word more I would say before proposing Militia or Volunteer schemes.

It seems to me a sad thing that, as a department, we do not regularly teach the Officers of the Army and the men what sanitary laws mean. In the long tedium of foreign service and in the winter months in England, I would have the army doctor teach, by lectures, ambulance instruction, sanitary laws, the way to avoid the common diseases of campaigns. It is lamentable to think how completely ignorant officers and men are of the very first principles of health preservation. I take it that no man is fit to command men and armies who does not know the laws of sanitary science and health preservation himself.

The ignorance on these subjects in our Army—always the very one that needs it most—is very great, and the loss of men in the beginning of a campaign from want of knowledge of how to avoid sickness is a most serious matter in a small army. Many men on our Egyptian sick list ailed simply from purely preventable disease. Want of food, want of shelter, and want of knowledge of what sun exposure means, contributed largely to it; for this, however, the medical service is not to blame, save that it has not in the long era of peace taught the Army the knowledge it ought to have. If our cavalry horses had broken down in any numbers, would there not have been a great outcry? We have classes for veterinary instruction at Aldershot and Woolwich. But no combatant Officer, as far as I know, has ever been regularly taught to look after the health of his men. I notice that the German Officer is taught the elements of sanitary science, yet he, living in his own climate and serving only in European wars, does not need it at all so much as our Army, which serves in every possible climate, and is liable to every epidemic and malarial disease.

But while I thus propose to teach the combatant Officer, I cannot forget to say that you must let us learn all we can ourselves. To-day, however, your Army surgeons are shut out from all contact with the London schools. The Army Medical Department has no point of contact with the great centres of London medical and surgical knowledge. The London garrison is altogether in the hands of the special Guards doctors, and they alone have the chance of seeing the practice of the London civil leaders of medical science. We hope that one day a great central military hospital for the whole metropolitan garrison will be formed either at Chelsea or elsewhere, and that we who have to spend long years on foreign service in India, the Cape, Ceylon, and China, may have the chance

of meeting the great London civil doctors, and learning all we can from them.

I now turn to the question of how we are to obtain the large reserves needed for war. We do not need heavy peace establishments, because in peace our hospitals have all the subsidiary services, viz., water supply, laundry, messengers, sewage, otherwise provided for. But in war we want a body of trained men to be called out to assist us.

I think we should have, of course, our own army reserve of men trained in the hospitals, and passed back into the reserve like ordinary soldiers. But if you work this reserve too rapidly we should only have boys to nurse our sick in peace, and hence we need a kind of extra establishment to be rapidly trained, say for one year, and passed into the reserve for the remainder of their service. These would be in addition to the ordinary peace need of a hospital and would be a kind of a one-year volunteers, as on the German or French system. We might get many who would spend a year in learning nursing for the sake of getting into civil hospital or nursing employment.

But I think that we ought to have a distinct militia branch of the Army Hospital Corps, called out yearly like the ordinary combatant militia. These men would be equal in number to the needs of the home army hospitals in war time, so as to free the regular hospital corps and its reserves for war; 1,500 such men spread over England, Ireland, and Scotland would enable us to be quite certain that when war occurred we could call out a body of partially trained attendants who would replace the regular men. When these men were called out annually, either at Aldershot or at the district centres, it would enable us to muster sufficient men of the regular and militia hospital corps men to go through all the field drill of the bearer-company and the pitching and working of field hospitals, a work of which we are to-day ignorant, because the hospitals are packed away in Woolwich Arsenal, and the regular corps is too weak to go through this field service drill. I do not know a more economical system than this of obtaining men, and I imagine we could all recruit for it in the districts. I would form in it again a militia reserve on the lines of the regular militia reserve, and so get together a number of men fit for the fatigues work of the hospitals in war.

We cannot possibly succeed if the subsidiary services of the hospitals are not provided for, and the way to provide for them is to copy, as far as possible, the methods used by the Army to secure

men. The formation of a militia hospital corps would, at any rate, give young men a chance of seeing if they liked the hospital duties, and they might eventually enlist into the regular service. I think if we once get the chance of enlisting a militia corps that, scattered as the medical department is over the country, it could secure recruits in sufficiency. While we have artillery, engineer, and infantry militia, I think we also need a medical militia. The militia educates men for the regular army, and so in like manner would our proposed militia hospital corps train men for our needs. I beg you will think of this proposed militia scheme. You cannot think to what difficulties we are put in England, even in times of petty wars, by the complete absence of such a body of men. We have to go about begging for help from every corps, and in the end the corps is weakened, its training is interfered with, and our nursing work is very indifferent.

Only give us a chance of acting as recruiting serjeants for a militia corps of our own, and we shall, I think, succeed in inducing men to serve under our Red Cross, and to learn discipline and ambulance work in our hospitals. Why should we differ from artillery, engineers, or infantry? They all have a strong militia help behind them. We, who need it greatly, have none. Can anyone devise a cheaper, an easier, a more constitutional, or a more common-sense scheme? If so, let us have it, our want is above all things *men*.

We come now to the Volunteer force of the country, and I would point out how completely insufficient its medical service is, measured by modern needs. It has no bearer-companies and no field hospitals; in fact, nothing behind the battalion surgeons and the regimental bearers. We need to organize in every county, and in every large town, a volunteer bearer-company or companies of a volunteer medical corps to supplement the already existing volunteer battalion surgeons. I believe that we could enrol in such a corps many hundreds of men who feel an interest in ambulance work, and many surgeons in civil life would take a commission in such a corps, and drill and organize the bearer-companies and field-hospitals. I would organize such companies like ordinary volunteers. Dress them like the Army Hospital Corps, and drill them in all ambulance and field hospital work. They would fill up a great want in the volunteer army, and they would also send us many men for a campaign, and we should thus be strengthened for war.

To begin such a movement you must first of all train your doctors. Last year a scheme was put forward asking the medical students of London to practise ambulance work, and enrol themselves as a volunteer branch of the hospital corps. Several schools are now at work at this idea, and if the Secretary of State for War will give them a capitation grant the movement will succeed. It will be of inestimable value to England in every way in developing ambulance knowledge amongst the civil doctors, and it is therefore to be hoped that official sanction will be given to the scheme. Your interest and sympathy in the movement would be a great aid. I hope we shall one day see paraded in London a battalion of trained medical volunteers composed of companies made up of students from the various metropolitan hospitals who will go through all the drill as privates, corporals, and serjeants, and so train themselves to command and control the bearer-companies and field hospitals of the future volunteer medical service. When that day comes we shall ask the brigade of Guards to meet the student corps in the park, and form up for the attack of a position; and as they dash forward over the field the bugles will sound the "lie down," and 500 men will throw themselves upon the ground as if wounded; the students' corps with its stretchers, ambulances, and all the *paraphernalia* of medical equipment will then sweep over the field, take up the sham wounded, convey them to the dressing station, and go through the routine of sham dressings, and finally convey them to regularly pitched field hospitals in the park. When this day comes we shall provide for London a most interesting sight, and for humanity a real triumph.

It is by such instruction we shall educate the public, and if England once knows what it is we, her military doctors, have been aiming to achieve, her heart will be stirred, and we shall have our one desire fulfilled.

Working on these lines, when war has been declared, the Director-General would simply telegraph to the Divisional P.M.O. "Mobilize." At once the regular Army Hospital Corps in the district would be called in to form the nucleus of the field hospital. The district army medical reserve men would join at the same centre to fill up the cadre of the nursing staff of the hospital. The militia hospital corps would be called out, and would take over the district hospitals, the extra men of the militia reserve joining the district field hospital, and the volunteers of the local bearer-company would no doubt join in certain numbers. The whole would then form a complete field hospital, and with their equipment, transport,

and staff, would embark as a body for foreign war. This seems easy, and it really is so. But it needs thinking out in peace, and that all arrangements should be made beforehand. I firmly believe it will one day come.

I have now roughly outlined the main points of our new medical field system. It is an interesting study, and I commend it to the soldier and to the civil physician for their consideration. To-day you have to reckon with new conditions in war, and the growing humanity of the race will not fail to demand due provision being made for the sick and wounded. If the establishments demanded are apparently heavy by comparison with the past, you must remember that the demands of a civilized race exceed the demands of old days and ruder times ; but the remedy against these increased establishments is to attend to the sanitary condition of the soldier in the field, and so prevent men going sick. If they do, you must provide liberally for their care and nursing.

Out of our great troubles in past wars we in the medical service are being ourselves educated as to what we want, and we should fail in our duty to England and the Army if we did not boldly state our needs. The autonomy of the medical corps of the Army is essential to our success, and the more it is fostered, the more we shall rise to efficiency in peace and in war. The more we are made dependent on others for success, the more likely we are to fail. If the remarks I have made in this paper at all aid to the better understanding of the war needs of the medical service, I shall be amply repaid.

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## Reviews.

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**THE EXAMINATION OF WATER AND WATER SUPPLIES.** By J. C. Thresh. Second Edition. London: J. and A. Churchill, 1913. Pp. xx and 644. Price 18s.

The second edition of this well-known book will be welcomed by all who have been familiar with the first edition, more especially as the high standard of excellence of the former edition has been well maintained. The size of the volume has been increased by nearly 200 pages, due to the amplification and rewriting of several sections and the addition of two entirely new chapters. The two new chapters deal with the examination of water for special purposes, and the examination of water by electrical methods.

The first part of the book deals as before with the examination of the sources from which water supplies are obtained, and is fully illustrated by examples from the author's unrivalled personal experience in such matters. Much emphasis is rightly laid on the necessity for a thorough personal inspection of the source of any water supply; the place which the bacteriological and chemical analyses take in the routine examination of a water supply is clearly shown.

Part II deals with the objects of analyses and the interpretation of the results of the physical, chemical, microscopical and bacterioscopic examinations of waters. The chapter on the interpretation of results of the bacterioscopic examination has been largely re-written, and here we looked for the fruits of the author's extended experience and for a review of the latest work on the subject. We were, however, a little disappointed that the views of only one observer are taken into consideration. It is true that observer is Dr. Houston, and the results of his experience on "*Bacillus coli* standards" are given verbatim, but we would have liked to see some mention made of the work of MacConkey and of the more recent work of Clemesha on the significance of the individual members of the lactose and glucose fermenting groups of organisms. We are given to understand that Houston's "agin" bacilli, i.e., any bacillus which ferments lactose and forms indol from peptone water, is an excretal *B. coli* and indicates faecal pollution. This classification may be sufficient for the Metropolitan water supply, but many would hesitate to apply it to all waters. The author himself doubts the correctness of this statement, for he says, "I should not regard the sagin and agin bacilli as belonging to the colon group."

Part III deals with analytical processes and methods of examinations, and at the end of the book are thirty-six excellent plates illustrating the microscopical appearance of various water deposits. An appendix gives the preparation of various reagents and media.

To the sanitary officer this book will be invaluable as a guide to the inspection of water supplies, and it is so brim full of Dr. Thresh's personal experiences that it makes most interesting reading.

H. B. F.



**"TUBERCULIN IN DIAGNOSIS AND TREATMENT."** By Drs. Bandelier and Roepke. London: John Bale, Sons and Danielsson, Ltd., 1913. Pp. xi and 294. Second English Edition, translated from the Seventh German Edition by W. B. Christophers.

The first English Edition of this work was fully reviewed in the *JOURNAL OF THE ROYAL ARMY MEDICAL CORPS* of June, 1909, but since that date the book has been completely revised, and is now issued in an enlarged form. Several alterations and improvements have been made in the subject matter.

The theory of tuberculin administration has now been collected into one section and placed at the commencement of the book, an improvement on the plan adopted in the former edition. Part II, dealing with the specific diagnosis of tuberculosis, is still divided into general and special sections, but in the former, much additional matter and a new coloured plate have been added, and in the latter a chapter on the diagnosis of tuberculosis of the digestive organs has been included. There are also considerable additions in the important section dealing with the treatment of pulmonary tuberculosis.

The authors still consider that immunization in pulmonary tuberculosis is best obtained by the administration of increasing doses, and this is the method they adopt in practice, although excellent results have been obtained with the repeated small dose method by physicians in this country.

This edition is printed in better type and the search for any particular point is facilitated by the insertion of side references. The book gives a clear and readable account of the present-day diagnosis and treatment of tuberculosis by means of tuberculin, the value of which is necessarily enhanced by the large experience of the authors.

O. L. R.

**ACUTE ABDOMINAL DISEASES.** By Joseph E. Adams, F.R.C.S., and Maurice A. Cassidy, F.R.C.P. London: Baillière, Tindall and Cox, 1913. Pp. 571, 28 illustrations. Price 12s. 6d. net.

In this book the authors have endeavoured to set forth the results of their experiences, and their object has been to discuss, compare, and contrast all the various acute diseases and injuries to which the abdomen and its contents are liable, treating these conditions from the point of view of both physician and surgeon. They have also aimed at making the account of each separate disease complete in itself. The result of their labours is the production of a most useful and instructive work, which may be read by student and practitioner with profit and pleasure. The chapter on intestinal obstruction has been particularly well written and the condition known as appendicitis has received its full recognition.

When writing of liver abscess the authors do not favour exploration as an aid to diagnosis. This is excellent in theory, but with a larger experience of liver abscesses they would probably find it necessary to modify their views of this procedure.

The concluding chapter contains excellent notes on the diseases which may simulate acute abdominal lesions. The work should have a wide sphere of usefulness.

J. W. H. H.

**CLINICAL LABORATORY METHODS.** By Roger Sylveston Morris, A.B., M.D. D. Appleton and Company, New York and London, 1913. 8vo. Pp. 343, 46 illustrations, 2 coloured plates. Price not stated.

The present volume is not a text-book of clinical pathology, but is intended to serve as a manual of laboratory technique and morphology for students and practitioners, and we think it fulfils its purpose. The book is divided into sections dealing respectively with the urine, gastric juice, fæces, sputum, and blood, and has a short section on puncture fluids.

All the ordinary tests or procedures likely to be of service to practitioners are clearly and accurately described, but we notice that in some cases the procedures recommended are somewhat complicated and would require apparatus not usually found in the ordinary clinical laboratory. The work is well illustrated and printed in good clear type. It can be recommended as a trustworthy guide to clinical laboratory work.

O. L. R.

**ELEMENTARY BANDAGING AND SURGICAL DRESSING.** By W. H. Clayton-Greene. Bristol: J. Wright and Sons, 1913, 13th Edition, pp. viii, and 230. Price 2s. net.

This up-to-date little book is well written and profusely illustrated.

Section I contains all there is to know about splints, and the chapters on bandaging explain the different methods fully and clearly.

Section II is full of sound information, and the only fault we have to find is that in the chapter on the treatment of burns and scalds, too much prominence is given to the use of oily applications and too little to the use of picric acid.

Section III is particularly good, especially the chapter on the treatment of cases of poisoning, and if this treatment were always carried out as advocated many lives would be saved. Altogether the book is an excellent one, and should be read by every student and surgeon.

J. W. H. H.

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## Current Literature.

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**Fumigation of Vessels for the Destruction of Rats** (S. B. Grubbs and B. E. Holsendorf, United States, Public Health Reports, vol. xxviii).—The authors of this paper consider the fumes of burning sulphur to be the most convenient and efficient fumigant. They state that "all parts of the vessel should be sulphured at the same time, including all compartments above deck from which the presence of rats cannot be absolutely excluded, as well as the holds; that the most careful preparation of a vessel is necessary; and that the fumigation of the holds alone, especially if containing freight, is of little value, if not actually harmful, as it may drive rats to the decks, whence they may more easily go ashore." They consider that fumigation of the holds of vessels containing cargo will rarely destroy all the rats in that part of the ship, and that if this procedure is resorted to it should be considered as a fumigation of the cargo only, and the vessel when empty should be again fumigated, all the compartments being fumigated simultaneously with liberal quantities of

sulphur. They believe it is best to use "4.5 per cent gas—5 lbs. of sulphur to 1,000 cubic ft.—for seven hours in the living quarters and engine-room, which cannot be closed overnight without hardship and delay, and to use 3 per cent sulphur dioxide in the holds and similar places with an exposure of at least twelve hours."

The routine of fumigation is carried out most carefully. The captain of each vessel is instructed to have all compartments including every enclosed space from the hold to the smallest locker as empty as possible, and open; to have canvas ready to batten down, including the main funnel, gratings over engine-room and any other opening that cannot be tightly closed; to have sections of pipe casings and floors in the holds, and of telegraph and pipe coverings on deck removed, unless these have been fitted with hinges. In the holds the dunnage is piled or slung up, so that it affords no hiding place for rats. The planking boards over the bilges are removed, the sounding and bilge-pipe casings are also removed in part. Ropes and canvas are removed from the lazarets and fore-peaks, a careful watch for rats being kept. In the provision storeroom all open stores and articles likely to be injured by sulphur are inspected and removed to the decks. The same is done with similar articles in the living rooms, dining rooms, &c. The blue prints of the vessel are examined to get the cubic capacities of the holds, engine-room, fire-room, bunkers and other compartments. When these capacities are not shown on the charts they are obtained by taking actual measurements.

W. H. H.

**Intravenous Inoculations of Living Typhoid Bacilli.**—Nicolle, Conor, and Conseil (*Compt. Rend. Acad. Sciences*, July 15, 1913, p. 147) have already shown that intravenous injections of washed living cholera vibrios and dysentery bacilli are harmless to man; they now report that typhoid cultures are also innocuous when administered intravenously.

Slopes of peptone-free agar are inoculated with a thin emulsion of *Bacillus typhosus*, and are incubated at 37° C. for fifteen or sixteen hours. The water of condensation is removed and replaced with warm physiological saline fluid in which the growth is emulsified. The suspension is then heated for twenty-five minutes at 46° C.; this attenuates but does not kill the bacilli. The emulsion is centrifugalized, the supernatant liquid sucked off, more saline is added and is mixed with the deposit of bacilli. By centrifuging a second time an even suspension of *B. typhosus* is obtained free from clumps, and of slight opacity; a drop contains 400 million typhoid bacilli. This number is diluted with 10 c.c. of saline fluid, and is injected into the veins. A second dose of 1,200 millions is given a fortnight later. More than 100 persons have been vaccinated in this manner. There is no local reaction, but often rigors and pyrexia lasting three or four hours are noted. In young subjects these symptoms are very mild.

In two, the agglutinative power of the blood thirty days after the second inoculation was 2,000 and 5,000, and the bactericidal titre 10,000 and 1,000 respectively. In another, the agglutination was 1,000 and the bactericidal power 100,000 ten months after vaccination.

Experiments were conducted to ascertain how long the bacilli survive in the blood. Blood was withdrawn two, fifteen, thirty minutes, one hour, and two days after the second injection from two people. The

*B. typhosus* was obtained by culture of the blood taken two minutes after the inoculation, but was absent from the samples taken later.

Twenty-four rabbits each received intravenously 80 million typhoid bacilli. Two were killed at intervals of five minutes, one hour, one day, two, four and eight days. The twelve surviving animals were given another dose of 160 millions on the fourteenth day, after which they were destroyed at similar periods. After the first inoculation cultures could be obtained from the spleen of the animals killed five minutes and one hour after the injection, but not later; the blood and liver gave positive results for the first twenty-four hours, but not afterwards. The bile and urine were always negative. The effects of the second dose were still more marked, for the blood, spleen and liver were sterile after the first hour. The bacilli therefore are not eliminated by the bile or urine. The *B. typhosus* has not been recovered from the dejecta of those men who were vaccinated. The destruction of the bacilli is very rapid in both men and rabbits.

C. B.

**The Rabbit Test for Syphilis.**—Uhlenhuth and Mulzer ascertained that the blood in 78 per cent of cases of primary and secondary syphilis injected into the testes of rabbits causes specific lesions (see JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, October, 1912, p. 516) and they now report on the infectivity of the blood and secretions in those cases of latent syphilis in which the Wassermann reaction is positive (*Berlin. klin. Woch.*, November 3, 1913, p. 2031). Out of fifteen cases in which there were no manifest signs present except a positive Wassermann reaction, in two only was the inoculation of the blood into the testes of rabbits successful. One of these was that of a woman who eighteen days previously had given birth to a syphilitic child; the other was one in which early syphilides appeared three days after the blood was taken. They had already shown that the blood is sometimes infective although the serum reaction is negative, hence a positive or negative Wassermann test does not necessarily imply the presence or absence of the *Treponema pallidum* in the circulation. Of eight cases of tertiary syphilis the blood was infective to rabbits in one case only. Similarly the inoculation test was negative in four cases of congenital syphilis, although the Wassermann reaction was positive. This accords with Hanau's experience with four cases of interstitial keratitis, and Igersheimer's with seven of the same disease; the serum test was positive, but the rabbit inoculation failed in every instance. Treponemata are rarely found on microscopical examination of the lesions of malignant syphilis, but Tomaszewski proved that they are present by infecting monkeys with the material from these lesions. Uhlenhuth and Mulzer have confirmed these observations and induced lesions in rabbits' testes with the blood and particles of tissue removed from the base of rupial sores in two cases of malignant syphilis. The urine of two patients suffering from early secondaries was innocuous to rabbits; but the semen of two out of six men in the early stage of secondary syphilis conveyed the disease when inoculated into rabbits' testes, although no spirochætes could be demonstrated microscopically. The milk of three out of eleven syphilitic mothers was infective. The test proved negative with the saliva of two early cases. In several instances the blood which was infective before treatment, no longer excited the disease after mercurial and salvarsan injections.

The authors tested the cerebrospinal fluid of sixteen general paralytics and tabetics with negative results; they state that Graves induced rabbit syphilis with the cerebrospinal fluid of two paralytics, one fourteen and the other eighteen years after the date of infection. The cerebrospinal fluid of three early secondary cases was infective.

Noguchi was the first to demonstrate *T. pallidum* in the brains of general paralytics. Many observers have confirmed his results. He and Landsteiner infected apes and rabbits with such material. The authors were successful once in five attempts to transmit the disease to rabbits by inoculations of the brain tissue of general paralysis patients.

The infection in rabbits is a septicæmia. Treponemata are present in the blood, liver, and spleen of the animal, since injections of these into the testes of other animals excite the disease. The microscope, however, fails to detect the spirochætes in the matter inoculated. Very few spirochætes are sufficient for the purpose, for 2 c.c. of a 1 in 1,000 dilution of an emulsion of a rabbit's syphilitic testis will cause orchitis in another animal. For the biological investigation of syphilis the rabbit is an invaluable animal, and surpasses the monkey in this respect.

C. B.

**The Education of the German Army Medical Officer** (*Berlin. med. Woch.*, October 6, 1913, p. 1844).—Nearly all army medical officers of the German Army are educated at the Kaiser Wilhelms Akademie. In addition to instruction in professional and army medical subjects facilities are given for learning English and French. On April 1, 1913, there were 470 students, including sixty for the naval medical service; the number is to be increased by 100 during the next five years. The last year of residence is passed at the Charité Hospital in practical professional work. At the present time 100 army medical officers are attending special courses to qualify as specialists in various subjects. There are also forty-two *Stabsärzte* (captains) on the staff of the Kaiser Wilhelms Akademie; while so employed these officers are encouraged to take up some special line of study or research. Refresher courses for all ranks up to Colonel are also held in the Kaiser Wilhelms Akademie every year and are attended by some 120 officers on the active list. In each provincial centre there are special courses attended by 170 officers of the reserve annually; they are usually held in the local universities; 110 officers of the regular army medical service also attend these courses. Originally these courses were instituted for instruction in military and operative surgery; they have now been expanded to embrace all subjects, especially the management of preventable diseases, which have a bearing on army medical work.

During their service medical officers also have to attend war games and staff rides and take part in general staff tours; a number are also detailed for duty with the field medical units at the autumn manoeuvres.

One year volunteer surgeons receive instruction in army medical organization and duties in the field, they take part in the instruction of stretcher bearers and in field days, and are given facilities to learn riding.

As "Untersärzte" they have to put in six weeks' training before being promoted to "Assistenzärzte," and in the latter capacity have to come up for three weeks' training. When due for promotion to "Oberarzt," medical officers in the reserve are called up for a four weeks'

course of training; this is generally held during the army autumn manoeuvres, the officers being detailed for duty with troops and medical units.

Medical officers of the reserve are also permitted to attend lectures, staff rides, and field days held for medical officers on the active list.

C. E. P.

**Motor Transport Troops in the Field** ("Kraftfahrtruppen im Felde," by E. S. Mittler and Sohn, Berlin).—According to a recently issued official manual (reviewed *Deut. militärärzt. Zeit.*, September 20, 1913), army motor transport comprises, *inter alia* :—

- (1) Motor ambulances ("Krankenkraftwagen").
- (2) Motor omnibuses ("Hilfskrankenkraftwagen").
- (3) Light motor wagons ("leichte Lastkraftwagen").

While other motor vehicles are restricted to well-made roads, Nos. 1 and 3 can be used at a reduced rate of speed for short distances on poor and fairly level roads.

Motor ambulance columns and motor wagon columns of the advanced depots of medical stores, line of communication, constitute the motor medical units ("Sanitätskraftfahrformationen").

In an emergency cavalry motor wagon columns can be utilized to forward medical material and also to evacuate sick.

Motor wagons placed at the disposal of medical units are utilized under the orders of administrative medical officers. The light motor wagons of the advanced depots of medical stores, line of communication, can, if necessary, be converted into temporary ambulance wagons ("Behelfskrankenkraftwagen"). These are at the disposal of the A.D.M.S., line of communication ("Etappenarzt"), and of the Director of Clearing Hospitals ("Kriegslazaretttdirektor"). If wagons are accompanied by a medical officer they are under his orders; if not, then under the orders of the senior medical N.C.O.

Distance covered on an average (ten hours' service, exclusive of loading and unloading) by the various wagons in miles :—

	On the flat	In hill country	In mountains
Motor ambulances in one hour .. ..	21½	15½	12½
„ „ in a day .. ..	125	94	62½
„ omnibus in one hour .. ..	18¾	12½	9½
„ „ in a day .. ..	94	62½	50
Light motor wagons in one hour .. ..	18-21	12-15½	9-12½
„ „ „ in a day .. ..	110	78	62½

With bad roads, especially in winter with snow and ice, the day's performance may be diminished by more than half.

		REQUIREMENT FOR 1 KM.		
		Benzine or Benzol	Oil	
		Kg.	L.	Kg.
Motor ambulance ..	0.3	0.4	0.015	These wagons all carry sufficient motor spirit for 200 km. or about 125 miles
" omnibus ..	0.5	0.7	0.02	
Light motor wagon ..	0.3	0.4	0.025	

Carbide, per hour, for passenger vehicles, 0.33 kg.; for other vehicles, 0.25 kg.

The drivers are entitled to free medical attendance, and are provided with two field dressings. J. V. F.

**The Treatment of Wounds in Mobile Field Medical Units.**—Stabsarzt Dr. Fritz Lotsch (*Berlin. klin. Woch.*, October 6, 1913) contributed a practical paper on this subject based on his and Hildebrandt's experiences in the Balkan campaign. He begins by stating that mobile medical units at the front are not the places in which to perform surgical operations. The main object of medical officers in these units should be to make their patients fit to be evacuated as quickly as possible. Only about 30 per cent of those wounded in the head survive to require surgical assistance, and their wounds are usually superficial ones of the skull. Although the wound may appear to be a slight one there is usually much splintering of bone. In any case the patient must be transported as rapidly as possible to a field hospital, as trephining must not be performed at a dressing station, owing to the impossibility of providing proper nursing and allowing the patient to rest after the operation. At the dressing station an attempt should be made to render the wound aseptic; a dressing should then be applied, and the patient sent at once to a field hospital.

On arrival at the field hospital, even when the wound of the skull appears to be a slight one and there are no serious symptoms, it should be explored and splinters removed.

Provided sepsis does not occur, the prognosis depends on the amount and site of the damage to the brain. C. E. P.

**The Medical Services of the Allies in the Balkan War.**—Méd.-Major M. Cousergue (*Archiv. Méd. Pharm. Mil.*, August and September, 1913) was sent on a mission to report on the working of the medical services in the armies of the allied Balkan States during the recent campaign. He has produced an elaborate report which finishes with a summary of the lessons to be learnt by the Army Medical Service of the French Army; the following notes have been taken from his summary:—

*Equipment.*—If it were possible to provide men with a bullet-proof helmet and shoulder straps many lives would be saved.

*Organization.*—A field ambulance which can remain immobilized near the field of battle and can take care of severe cases should prove most useful. The new French type of field ambulance is admirably organized to fulfil this purpose. Prepared dressings were found to be of the greatest service. Every officer and man must understand how to apply his first field dressing.

One X-ray apparatus should be provided for each Army Corps; an apparatus mounted on a motor-car and manufacturing its own electricity would be ideal. It could be kept at the advanced depot of medical stores, and after a battle it could be sent up to visit all units requiring its services. This plan was successfully employed in Epirus.

The collection of wounded can only rarely be carried out in the daytime, and the usual time will be at night. Stretcher bearers must therefore have a good lamp, the light from which should be capable of being obscured when not actually required.

The bulk of the wounded will always evacuate themselves, but arrangements must be made to indicate to them the whereabouts of medical units. If ambulance trains can be brought up close to the battlefield evacuation is made much easier. No surgical work should be undertaken at the advanced dressing station.

In the immobilized field ambulance the following categories of wounds should be retained for some days, and any necessary surgical procedures carried out: penetrating wounds of the skull, chest, abdomen, large joints, fractures of the spine and of long bones, and all septic cases.

The stationary hospital near the front should receive all wounds of soft parts and mild cases of sickness, as both of these classes should be fit to return to duty in something like ten days. Severe cases of disease should be retained in hospitals near the front till able to bear the journey. Infectious cases should not be evacuated to home territory owing to the elaborate precautions necessary to prevent the spread of infection.

The arrangements suggested above do not tally with the *évacuation à outrance*, which, owing to local conditions, had to be employed during the Russo-Japanese War. In Western Europe, where ample facilities for treating large numbers of sick and wounded are available, it would be folly to attempt wholesale evacuation to the home territory.

Cousergue also points out that the term "Unfit for transport" has given rise to some confusion in the mind of medical officers. Cases of penetrating wounds of the skull, abdomen and spine cannot be left lying where they happen to be wounded, but must be conveyed to the nearest hospital. A long journey is out of the question, but one of a couple of hours, especially by motor ambulance, is permissible, provided it ends in a properly equipped hospital, where skilled surgical treatment is available. The term "unfit for transport" should be replaced by "unfit for evacuation."

Cousergue thinks that casualties may safely be calculated on the following scale:—

Wounded .. .. .	10	per cent of the troops actually engaged.
Wounds by rifle bullets .. ..	90	" of total wounded.
" artillery fire .. ..	0.5	" "
" cold steel .. ..	9.5	" "

Mortality among wounded when serious cases are kept in the zone of army operations:—

On the field of battle .. .. .	10	per cent of the wounded.
At the advanced dressing station .. ..	2	" "
At the field ambulance .. ..	3	" "
In hospitals of the home territory .. ..	0.25	" "

Admissions and deaths from disease:—

Daily sick .. .. .	22	per 1,000 of strength.
Annual death-rate .. ..	16.5	" "

These figures are lower than those usually given, but Cousergue thinks that they are justified by the better use of cover, natural or artificial, and by the increased efficiency of the medical services. C. E. P.

**The Technique of Injecting Neo-salvarsan.**—Bayet (*Archiv. Méd. Belges*, August, 1913) has employed Ravant's method of injecting neo-salvarsan in a large number of cases in the Hospital of St. Pierre,



Brussels, and reports favourably on it. He dissolves the neo-salvarsan in 10 c.c. of freshly boiled tap water, previously filtered through a plug of cotton-wool. The solution is drawn into a syringe and injected into a vein. The dose of neo-salvarsan varies from 0.45 grm. to 0.9 grm., but the same quantity of water is always used. Bayet has never observed any unpleasant sequelæ. He gives the following directions: (1) Begin with a small dose; (2) allow an interval of at least one week between doses; (3) gradually increase the dose, but never give more than 0.9 grm. at one time.

C. E. P.

**Frozen Meat.**—At the request of the Army Medical Department of the German Army, Stabsapotheker Dr. W. Storp (*Veröff. Gebiete Militär.-Sanitätswesens*, Heft 55, 1913) undertook a series of investigations to determine the value of frozen meat as an article of diet for the soldier. Facilities for the investigation were afforded him by several commercial firms engaged in the frozen meat trade. His principal conclusions are:—

(1) During the first few months of storage frozen meat does not undergo any alteration in odour, taste or colour.

(2) During storage frozen meat loses weight by evaporation; the extent of the loss depends on the humidity of the storage chamber, on the structure of the muscles, on the size of the pieces of meat and on the extent to which the meat is covered in by subcutaneous tissue.

(3) When slowly thawed little loss takes place during the process.

(4) The juices which exude during the process of thawing are rich in nutritive substances; in spite of this loss frozen meat, owing to the loss of water by evaporation, has weight for weight a higher nutritive value than fresh meat.

(5) The degenerative changes in the albuminous constituents of meat during storage are negligible; the existence of peptone could not be detected.

(6) If the frozen meat is kept in a cool place it remains good for forty-eight hours after having been thawed. In a warm moist atmosphere decomposition takes place more rapidly than in the case of fresh meat; this is owing to the fact that the process of freezing has opened up the planes of cellular tissue and so facilitated the penetration of bacteria to the interior of the meat.

(7) The fats did not show any change after two months' storage.

C. E. P.

**Siege of Port Arthur.**—In a work recently published by Commandant A. H. on the Siege of Port Arthur, he states that in the Japanese forces the proportion of casualties caused by different weapons during the Siege was not quite the same as occurred during the battles in open country, as shown by the following table:—

			In battles in open country		At Port Arthur
Wounds caused by artillery fire	..	..	8 to 12 per cent	..	20 per cent
„ „ infantry fire	..	..	84 „ 85 „	..	73 „
„ „ cold steel	..	..	3 „ 5 „	..	7 „

Wounds caused by mines and hand grenades are probably included among those caused by artillery fire.

C. E. P.

**Deterioration in Aluminium Water-bottles.**—Oberstabsapotheker Dr. Strunk (*Veröff. Gebiete Militär.-Sanitätswesens*, Heft 55, 1913) was ordered to investigate the changes which had taken place in four aluminium water-bottles in a mobilization store. Some of the bottles showed small blister-like elevations on the outer surface, some merely a rough patch; one of these patches when scratched with a finger nail yielded to the pressure and a large hole resulted. On cutting open the water bottles their inner surface was found to be more or less generally corroded. In two of the cases the corrosion appears to have resulted from the bottle being left with water in it; after evaporation the residual salts of the water attacked the aluminium and caused the corrosion. In the other two cases coffee appeared to have been left in the bottle when last used. An analysis of the metal showed that its composition conformed to the standard laid down. Strunk recommends that all new water-bottles in mobilization stores should be sealed up with paraffin to protect them from deterioration. C. E. P.

**Consumption of Sea Fish in the Prussian Army during 1911.**—*Die Fischwoche* of February 22, 1913, contains an interesting article showing the consumption of sea fish in the Prussian Army. The total quantity used in 1912 was  $21\frac{1}{2}$  tons. In some cases a ration of 18 oz. of fish was issued in place of meat for dinner; a good deal of fish was used for the supper meal. The cost of fish for each ration was on the average  $\frac{1}{4}$ d. less than that of meat. Where fish cooking classes were held the consumption was greatest. Very full statistics are given as to the kinds of fish demanded by different units, but haddock was the favourite. C. E. P.

**Auxiliary Hospitals of the Union des Femmes de France** (*Bulletin Officiel, Union des Femmes de France*, May, 1913).—This Society has issued a special number of its Bulletin, giving a summary of the regulations published in different decrees in connection with the organization and working of its auxiliary hospitals.

The Regional Delegate is the representative of the Society, and is the link between the district committees and the central committee, as also between the military authorities and the district committees of the Society.

He is responsible that preparations are made to meet the requirements in war, and will maintain communication with the district committees and with the director of medical services in the area.

On mobilization he will see that the auxiliary hospitals in his area are got ready as soon as possible, and will report himself to the General Commanding the area, and also to the Director of Medical Services.

Before taking over buildings owned privately, for the purpose of establishing a hospital, he will see that the local committee make an inventory of the contents.

During war time he is authorized to requisition articles required for use in the Society's hospitals.

On mobilization the district committees become local executive committees and undertake the organization and management of all services provided by the Society.

The provision of personnel and matériel is controlled by a directress of personnel and by a directress of matériel.

Each hospital has a medical officer in charge, a staff of medical officers, a directress, sisters and nurses; the clerical, steward's and quartermaster's duties are performed by ladies; the duties of each appointment are fully detailed in this Bulletin. C. E. P.

**L'Union des Femmes de France** (*Union des Femmes de France Bulletin Official*, June to July, 1913).—At the Annual General Meeting of this Society the financial position was as follows (in round numbers):—

The Central Committee possessed—

In liquid assets	£35,000
In property (hospitals, field medical units, convalescent homes, &c.)	28,000

The Provincial branches had—

Liquid assets and property to the value of	£242,000
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Among the various sources of income may be noted: The sale of the "blue flower," this brought in £1,140; the sale of the special stamp produced nearly £2,000; the share of profits from the "Paris Mutuel" was £2,000.

In 1913 the Society had nearly 42,000 members.

The Society has 960 trained nurses and 640 auxiliary nurses, also 840 ladies and 560 assistants who have received instruction in hospital management. Of these 480 lady nurses, 320 auxiliary nurses, 420 lady stewards with 280 assistants have been detailed for duty in the Society's 90 hospitals on the outbreak of war. In addition the Society has organized 60 detachments of trained nurses, each consisting of a sister-in-charge and 5 nurses; on mobilization these detachments will be ready to be sent wherever their services are required. C. E. P.

Journal  
of the  
Royal Army Medical Corps.

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Original Communications.

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COMPLEMENT DEVIATION IN THE DIAGNOSIS OF  
GONOCOCCAL INFECTIONS.

BY MAJOR L. W. HARRISON.

*Royal Army Medical Corps.*

WHEN treating gonorrhœa it is extremely difficult to decide whether the patient is cured, and in cases of chronic urethritis it is often equally difficult to decide whether the gonococcus or some other micro-organism is the offender. Failure to find the gonococcus in smears, or to cultivate it from the secretion expressed from the urethra, is of little value, since, as is well known, the gonococcus may lie deeply buried in some of the follicles, glands, or their ducts which open on the mucous membrane and may appear only intermittently in the urethral secretion.

Failing other methods of diagnosis we must examine numerous specimens of urethral discharge microscopically and by cultural methods. Often we may fail to find the gonococcus though later events prove the gonorrhœa to have been still uncured or, on the other hand, we may erroneously attribute a mild urethritis to the gonococcus because no micro-organism can be found to account for it. These points are illustrated by the following cases, which are typical of their kind :—

(1) A patient was treated for six months for a first attack of gonorrhœa. For the last three months of this time he was free from discharge and no gonococci could be found in any of the

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numerous specimens of secretion which were expressed from his prostate, seminal vesicles, and urethra. Six months later, without further exposure to infection, the urethritis returned, with gonococci in the discharge, and this was quickly followed by an attack of epididymitis. A month previously this patient would have been pronounced fit to marry.

(2) This patient had suffered from gonorrhœa eight years previously, but had been free from urethral discharge for seven and a half years, during seven of which he had been married, and his wife remained in good health. Two months before I saw him he had suddenly developed a profuse, purulent urethral discharge which had now diminished to a slight gleet in which no micro-organisms could be found. No definite statement as to the nature of the urethritis could be made, and for the sake of safety he adopted the precautions required of a married man suffering from gonorrhœa. Six months later the urethral discharge ceased, but a few weeks after this it returned as profusely as ever and a specimen of the pus which was then examined resembled a pure culture of staphylococci mixed with pus cells. It is true that a microscopical examination of the discharge when it first appeared would probably have revealed the nature of this case at once, but it happens so often that the microscopical examination cannot be made when it would be most useful.

Such cases as these illustrate the limitations of microscopical methods in gonococcal infections, and make it clear that additional tests are required.

Irons (*Journal of Infectious Diseases*, 1908, p. 279) has suggested the use of vaccine as a diagnostic agent in a manner analogous to the tuberculin test in tubercular disease. His observations have been confirmed by others, especially with regard to the temporary increase of symptoms which often follows the injection of a moderately large dose of gonococcal vaccine, but it must be said that frequently the test is negative, though subsequent events show the case to have been gonococcal in nature.

The complement deviation test as an aid to the diagnosis of gonococcal infections does not appear to have attracted the attention it deserves, in spite of the work of a small number of observers, who have shown that, for practical purposes, it is specific.

Müller and Oppenheim (*Wien. klin. Woch.*, 1906, p. 894) using as antigen an extract of gonococci, obtained a positive result with the serum of a patient suffering from gonococcal arthritis, while the serum of another patient suffering from arthritis due to other causes gave a negative reaction.

Bruck (*Deutsch. med. Woch.*, 1906, p. 1368) demonstrated that the serum of rabbits which had been immunized against the gonococcus deviated complement in the presence of a watery extract of gonococci. He also obtained positive reactions with two out of six cases of salpingitis, and one out of a number of cases of epididymitis and urethritis.

Teague and Torrey (*Journal of Medical Research*, 1907, p. 223) demonstrated by means of the complement deviation test the multiplicity of strains of gonococci. Thus, the serum of rabbit A immunized against gonococcus A deviated complement in the presence of antigen prepared from gonococcus A, but not with that made from gonococcus G or H, while the serum of rabbits G or H immunized against gonococcus G or H would give positive reactions with extract of G or H gonococcus but not with A. As a result of their work on these lines they separated the gonococci obtained from ten different sources into three groups.

Vannod (*Centralbl. f. Bakt.*, Orig., 1907, pp. 10 and 110) tested by this method the serum of immunized rabbits against gonococci and meningococci, and found that by it gonococci could be distinguished from meningococci. For antigen he used 0.1 c.c. of a well shaken and centrifugalized emulsion of gonococci. Guinea-pig serum 0.1 c.c. was used for complement, and the immune serum was tested in amounts which varied from 0.01 c.c. to 0.001 c.c.

Wollstein (*Journal of Experimental Medicine*, 1907, p. 588) tested for complement deviation the serum of four rabbits which had been immunized against the gonococcus. She used as antigen a watery emulsion of a twenty-four hour growth of gonococci. The emulsion was allowed to autolyze under toluol over night at 37° C. and was then centrifugalized, the toluol being driven off at 38° C. The amount of complement used was 0.025 to 0.05 c.c. and the hæmolytic system consisted of hen's red cells sensitized with antihen serum. The serum was tested first with a fixed amount of antigen (0.1 c.c.), and the smallest amount of it which would bind the complement was found by titration. The antigen was then titrated against twice this quantity of serum, using the same amount of complement. Working in this way she found, for example, that 0.02 c.c. serum sufficed to deviate the complement when incubated with 0.1 c.c. antigen, and on titrating the antigen against the fixed amount of serum (0.05 c.c.) the complement was bound by quantities of extract ranging from 0.1 c.c. to 0.002 c.c. Pursuing the titration further with the quantity of antigen fixed

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anew (0.005 c.c.), the complement was bound by amounts of immune serum ranging from 0.05 to 0.0005 c.c. Control extracts made with *M. catarrhalis*, streptococci, *B. typhosus*, and two varieties of dysentery bacilli failed to produce any deviation of complement with anti-gonococcus serum, and, conversely, an anti-typhoid serum failed to deviate with a gonococcus extract. On the other hand, it was found that meningococci could not be distinguished with certainty from gonococci by this method.

Meakins (*Johns Hopkins Hospital Bulletin*, 1907, p. 255) obtained positive results in two out of three cases of gonococcal arthritis and in cases of gonococcal prostatitis and chronic urethritis.

Watabiki (*Journal of Infectious Diseases*, 1910, p. 159) used as antigen a 24- to 48-hour old culture emulsified with distilled water, heated at 60° C. for thirty minutes, shaken for forty-eight hours and spun in the centrifugal machine. Gonococci from eight sources were used, a separate antigen being prepared from each strain. The extract was always freshly prepared and never more than three days old. A fixed amount of guinea-pig serum complement was used, and the serum was tested in amounts which varied from 0.1 c.c. to 0.001 c.c. against each of the eight extracts. One normal serum in a quantity of 0.1 c.c. gave a positive reaction with six of the extracts, but two others gave negative reactions with all eight of the extracts; no normal serum gave a reaction in a less amount than 0.1 c.c. Two out of three cases of chronic or subacute gonorrhœa gave positive reactions with seven out of the eight strains, using 0.05 c.c. serum, but two cases of acute gonorrhœa were negative. The reactions given by the serum of animals immunized against the eight strains of gonococci confirmed the conclusions of Teague and Torrey as to the multiplicity of strains of gonococci, the eight strains being divided into two groups by means of this test.

Lederer (*Wien. med. Woch.*, 1912, No. 40) obtained positive reactions with the serum of gonococcal cases using arthigon (a commercial gonococcal vaccine) as antigen.

McDonagh and Klein (*Journal of Pathology*, 1913, p. 559) have proposed the complement deviation test as a guide to the administration of gonococcal vaccines. Their antigen was an emulsion of a 48-hour growth of recently isolated gonococci on ascitic or pleuritic fluid agar. The emulsion was standardized to a strength of 300 to 500 million per cubic centimetre. Working with fifteen different strains of gonococci, from each of which an antigen was prepared, they found that different strains varied in their deviating

properties with anti-gonococcal serum, and that those strains which gave the best deviation with positive sera had a greater immunizing value as vaccines. The proportions of reagents used in their test were: Complement, one volume (0.1 c.c.) containing three minimum hæmolytic doses; serum, one volume of a 1 in 5 dilution, and antigen one volume of the lowest dilution which allowed complete hæmolysis when tested with a normal serum.

Probably the most valuable work on the application of complement deviation to the diagnosis of gonococcal infections has been done by Schwartz and McNeil (*American Journal of Medical Science*, vol. cxli, 1911, p. 693). These workers tested 324 sera of patients suffering from gonococcal and other infections. Having confirmed the conclusions of Teague and Torrey as to the multiplicity of strains of gonococci, they considered that for diagnostic purposes the best antigen would be a mixture of several different strains of gonococci and therefore used an emulsion of 9 to 12 strains, heated at 56° C. for thirty minutes, shaken for twenty-four hours and then centrifugalized. The amount used was that which deviated complement with an anti-gonococcal serum, provided that twice this quantity did not deviate the same amount of complement when incubated with a normal serum. Guinea-pig serum was used as complement, the amount being 0.05 c.c. of a 1 in 10 dilution; the amount of tested serum was 0.15 c.c., and after incubation of serum, complement, and extract for one hour at 37° C., 0.05 c.c. of a 5 per cent suspension of sheep's cells was added with 0.5 c.c. of a suitable dilution of anti-sheep-cell amboceptor. Some of their results were briefly as follows: Acute gonorrhœa, 1 positive in 6 cases; chronic gonorrhœal urethritis, 38 positive out of 48 tests; chronic prostatitis with a history of gonorrhœa, 17 positive out of 25 tests; gonococcal epididymitis, 2 positive out of 3; clinically cured gonorrhœa, 22 positive out of 51; gonococcal arthritis, 14 positive out of 14; arthritis of doubtful gonococcal origin, 4 positive out of 7; gonorrhœa in women, 23 positive out of 29; miscellaneous cases with no signs or history of gonorrhœa, none positive out of 20.

It appears from the results which have been quoted that the complement deviation test is one which can reliably be applied to the diagnosis of gonococcal infection; in other words, that a positive reaction to this test indicates that the patient has at some time been infected with the gonococcus. The question arises how long after the disease has been completely cured do gonococcal antibodies remain in the patient's blood. If they remain many



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months after cure the value of the test is considerably diminished since a positive reaction would merely indicate that the patient had at some time been infected. It is a question which has so far not been worked out for human subjects, though Schwartz and McNeil tested all their vaccine-treated cases some months later and found them to be negative. Torrey (*Journal of Medical Research*, 1910, p. 95) found that gonococcal antibodies began to disappear from the blood of immunized animals on the tenth and were absent by the fiftieth day. We know also that an attack of gonorrhœa confers no lasting immunity, and it seems justifiable, therefore, to conclude from a positive reaction that the patient is either suffering from uncured gonorrhœa or has so recently been cured that it hardly affects the question.

Being impressed with the possibilities of the complement deviation test in diagnosis, I have recently made a number of experiments with a view to increasing its delicacy, since the more delicate the test the greater the value of a negative reaction. Probably the best method of doing this is that of Wollstein, mentioned above, but it is too elaborate for clinical use. Previously in testing the sera of acute cases, mainly on the lines indicated by Schwartz and McNeil, I had obtained a high percentage of negative results. It was noticed, however, that a fair proportion of the sera which eventually gave a negative reaction did so slowly, that is to say that lysis was slower in these tubes than in those devoted to the testing of the normal sera. It was evident that in these cases more complement had been deviated than by normal serum and gonococcal extract, but that too much complement had been added in the first place, and the excess had masked the reaction. Accordingly the complement was reduced to 1·3 hæmolytic doses and the antigen increased to the largest possible amount.

The technique I have employed is as follows: (1) The antigen is a freshly prepared emulsion in physiological salt solution of gonococci grown for forty-eight hours on Wertheim's human serum agar. Three or more strains of gonococci are used and the growth is removed with a platinum loop rather than by washing it off, so as to exclude the serum of the medium as much as possible. The emulsion is shaken for an hour in contact with broken glass and not centrifugalized. As McDonagh and Klein have pointed out, older emulsions do not act nearly so well as those freshly prepared, and I have found this to be the case even when they have been kept frozen. The amount of antigen to be used in the test is found by careful titration. Into each of a series of tubes is

placed a volume (0.12 c.c.) containing 1.3 minimum hæmolytic doses of complement, and into the same tubes are placed volumes of the emulsion in varying dilutions thus: 1 in 2, 4, 8, 16, 32 and 64. One volume of salt solution is then added to each tube and the mixtures are incubated in a water bath at 37° C. for forty-five minutes. At the end of this time to each tube is added a volume of sensitized cells (see later) and, after shaking, the incubation is continued for another forty-five minutes. The reading which is taken at the end of this time shows the anti-complementary power of the antigen when acting alone, and one can estimate from this the quantity which can safely be used in the test proper. This is fixed at one volume of twice the dilution which slightly interferes with lysis. Thus if the tube containing 1 in 2 emulsion showed no lysis and that containing 1 in 4 showed very considerable or almost complete lysis a dilution of 1 in 8 would be chosen. It is necessary to allow full time for incubation both before and after the addition of the sensitized cells, since too short a time in the first instance may not allow the antigen to exercise its full anti-complementary power and too low a dilution might be chosen, while if full time is not allowed for hæmolysis to occur higher dilutions may be read as interfering with lysis, and too small a quantity of antigen might be used in the test proper.

*The complement* is derived from guinea-pig serum, either fresh or after being kept frozen, and the amount is, as mentioned, 1.3 minimum hæmolytic doses.

*The tested serum* is heated at 55° C. for half an hour on the day of the test, whether or not it has been previously heated, so as to remove its natural complement and as much of its anti-complementary power as possible. According to my experience, sera which have been kept sealed in capsules in the ice-chest for two to three months give the same reactions as when tested at once.

*The hæmolytic system* is a suspension of sheep cells sensitized with ten hæmolytic doses of amboceptor. The cells are washed five times, and of the deposit from the final washing a 3 per cent. suspension is made in physiological salt solution. The reasons for sensitizing so heavily are to obtain the highest possible titre of complement, and also to make of no account the varying amount of natural anti-sheep-cell amboceptor which is present in a high percentage of human sera. The delicacy of the test lies in the small excess of deviation over that produced by non-gonococcal serum and emulsion which is required to produce a positive reaction, and the safety of this lies in accurate titration of the

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complement and the anti-complementary power of the antigen beforehand. The titre of the complement up to a certain point depends on the amount of hæmolytic amboceptor with which the cells are sensitized, and it follows that if the cells are lightly sensitized before the test the titre of the complement as estimated by the preliminary titration cannot be the same as when the human serum, adding its own hæmolytic amboceptor, is present.

The formula for the test is as follows:—

Tested serum 1 in 10, one volume.

Complement 1·3 minimum hæmolytic doses, one volume.

Antigen in dilution ascertained by titration, one volume.

Incubate for forty-five minutes in a water-bath at 37° C., and add sheep's sensitized red cells, one volume.

Controls: Each serum is incubated with complement, in the same amount as in the test, and with one volume of saline in place of the antigen. This tube must show rapid and complete hæmolysis after the addition of the sensitized cells.

A normal and a positively acting serum must be included in each batch of tests. It is convenient to place the former at the end and the latter at the beginning of the series.

After the addition of the sensitized cells to each of the tubes, they are shaken and incubation is continued till the tube containing the normal serum control shows complete hæmolysis. If this tube has been placed last in the series it has received its sensitized cells last, the free complement in it has had the least time in which to act, and it is reasonable to argue that when hæmolysis is complete here any failure of hæmolysis in other tubes is due to interference with the complement. On this account I think it safe to take the first reading ten minutes after the normal serum tube shows complete hæmolysis. The strength of the reaction can be determined roughly by allowing incubation to proceed for an hour longer, reading again, and making a final reading after the tubes have rested over night in the ice-chest. In certain tubes which at the first reading showed no hæmolysis some degree of hæmolysis may be apparent at the second reading, and after the tubes have stood over night in the ice-chest a still larger proportion show some lysis. Those in which there is no lysis after standing over night are read as the strongest reactions, and so on.

*Results.*—One hundred and twenty-one specimens of serum from 88 persons, normal or suffering from gonococcal or other affections, were tested by this method and gave the following results: Acute or subacute urethritis, first attack and without com-

plication (except in three positive cases in each of which there was a periglandular infiltration a centimetre behind the glans penis); positive, 21 specimens from 13 patients; negative, 7 specimens from 7 patients. Chronic urethritis, positive, 4 specimens from 4 patients; negative, 2 from 2 patients. Epididymitis, positive, 26 specimens from 13 patients; negative, 3 from 2 patients. Prostatitis ranging in severity from prostatic abscess (2 cases) to simple enlargement with palpable focus, positive, 10 specimens from 5 patients; none negative. Gonorrhœa with some rise of temperature and lumbar pain, one case positive. Arthritis and synovitis, positive, 9 specimens from 4 patients; negative, 3 from 2 patients. Of the negative cases of arthritis, one suffered from slight adhesions in the knee-joint, the result of an old attack of arthritis some months previously; the other had simple effusion into one knee-joint without pain or rise of temperature. Normal persons and those suffering from other diseases, but with no recent history or signs of gonorrhœa, as far as could be ascertained, 35 specimens from as many persons were all negative with the exception of one which gave a strongly positive reaction. This patient was on the syphilis register and attending regularly for blood examination by the Wassermann test. He did not admit having suffered from gonorrhœa, but I have not had an opportunity of examining him more closely. His serum deviated twice the amount of complement employed as a routine in the above-described test, and would have reacted to much less delicate tests.

The above results show a lower proportion of positive reactions with the serum of cases of gonococcal arthritis than other workers have obtained, but the number of tests is so small that the delicacy of the test cannot be judged from this. On the other hand, the positive reactions given by the sera of acute urethritis cases appear to be higher than has usually been obtained, and as it is generally agreed that the smallest percentage of positive results is to be expected from the sera of such cases, it is reasonable to expect that the method which has been described will give a high percentage of positive reactions in cases of chronic urethritis. It is in these cases that the test is, of course, most likely to be useful from a diagnostic point of view.

I am indebted to Lieutenants T. E. Osmond and J. L. Huggan, R.A.M.C., for valuable help in carrying out the above tests.

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## COLLOIDS.

BY COLONEL R. H. FIRTH.

A FEW weeks ago, one was somewhat astonished to be asked by a young medical officer, possessed of a double-barrelled degree from a North British university, as to what a colloid might be. Replying to his question by another question, whether he knew any Latin or Greek, one gathered that he knew a little of the one language but nothing of the other. Presenting him with a Latin and Greek dictionary, one made him look out the words "colla" and "eidos," with the result that he came to the conclusion that a colloid was a substance resembling glue. A few days later, I was playing about with some photographic reagents, and happened to add together about equal parts of a 1 in 500 pyrogallol solution and a 1 in 100 solution of the commercial gold chloride; the result was a liquid which was blue in transmitted but brick-red in reflected light. As one knew that here was a typical example of what is a colloid, I sent for my young friend and gave him a discourse on the nature of colloids generally. As the substance of my harangue may be of use to others, I put it forward in an amplified and non-colloquial form.

To Graham's work in the early sixties, we owe our original knowledge of colloids. In studying dialysis, he found that some substances passed freely through a parchment septum into the surrounding solvent, while others failed to do so, or diffused very slowly. Since the former were substances known to crystallize, while the latter, like albumin, gelatine and glue, &c., were known only in the amorphous condition, Graham divided all soluble bodies into crystalloids and colloids. Another result of Graham's work was that a number of substances, generally considered insoluble, could be obtained in apparently real solutions, but as they were not diffusible these colloidal solutions were termed "sols." These sols differ further from true solutions, say, for instance, one of common salt, in that the addition of a very small amount of electrolytes which do not react at all with the dissolved substances, sooner or later cause a radical change in the condition of the sol. Thus, a trace of carbon dioxide causes a silicic acid sol to set to a translucent jelly; while a very little sodium sulphate precipitates a ferric hydroxide sol into a flocculent mass. These jelly-like precipitates are commonly called "gels." These elementary

facts indicate clearly that sols are to be considered as systems definitely different from true solutions. Further, we must regard colloids to be not a definite class of substance, as Graham thought, but that, by suitable methods, a large number of substances can be prepared in a colloidal condition, which must be regarded as a state rather than as a form of matter.

A large number of sols of the metals and of the oxides, hydroxides, and sulphides are known and capable of being prepared in a work room, as instanced by the sol one made of gold chloride. But, in contrast to these artificially prepared products, there exists a large group of substances which can be dissolved at once to form colloidal solutions; typical examples are starch, agar, gelatine and albumin. Some, like gelatine, form solutions above a certain temperature, and if this falls below a limit, depending on the degree of concentration, the solution sets to a jelly which can be melted or re-dissolved again. On the other hand, albumin is soluble at ordinary temperature, but coagulates on heating to an insoluble mass. Ordinary gum-arabic makes a viscous liquid which does not set to a jelly, either on cooling or heating. In spite of these various behaviours, these are all colloids, as they have the feature of not diffusing through a parchment membrane. Another characteristic of colloidal solutions is that there is no raising of the boiling or lowering of the freezing-point. It is not essential that water be the solvent to make a colloidal solution; striking examples of this are presented by the solutions of cellulose in copper-oxide-ammonia, or of nitro-cellulose in acetic acetone or in ether-alcohol, which all play a big part commercially in the production of photographic films and artificial silk. In all these cases, they are non-diffusible, and consequently are colloids. Another feature of colloids is that their gels have the power of taking dissolved substances out of solution and retaining them with some tenacity. This is called "adsorption," and in some cases is selective, as we know in the case of some micro-organisms and plants. An excellent example of this are certain seaweeds, which, by selective adsorption, demonstrate the existence of iodine in sea water, which by ordinary tests cannot be demonstrated to be present in sea water at all.

The organic colloids are fairly obvious, but the preparation of some typical inorganic sols may be helpful to the reader. One has given an example already in the case of gold chloride and pyrogallol. Another is, take 4 or 5 c.c. of commercial gold chloride and dilute to 100 c.c. with distilled water; add three parts of a two per cent tannic acid solution to one part of

the dilute gold chloride solution, and a blue gold sol results. If the proportions of reagents are equal parts, the gold sol will be ruby-red. A silver sol can be made by adding ammonia, drop by drop, to 5 c.c. of a one per cent solution of silver nitrate until the precipitate just disappears, and then diluting to 100 c.c. with water. If an equal part of this solution be mixed with the tannin solution, mentioned above, a silver sol results which is brown and clear in transmitted but greenish in reflected light. A very easy sol to obtain is that of ferric hydroxide. Boil half a litre of water and while it is boiling add 5 c.c. of a 33 per cent solution of filtered ferric chloride. A clear brown-red sol results, which yields readily its free hydrochloric acid on dialysis. Another sol which can be made easily is that of arsenic trisulphide. Boil 2 gm. of white arsenic with 150 c.c. of water, filter and cool. If hydrogen sulphide be passed through the cold solution, an orange sol results, having a marked green surface colour in reflected light. A sol of antimony trisulphide is made by dissolving 2 gm. of tartar emetic in 100 c.c. of water. If this be mixed with an equal volume of a dilute ammonium sulphide solution, a yellow or orange sol results. That all these are true sols is demonstrable by the fact that they are non-diffusible, also by placing them in a glass vessel with plane parallel sides and then concentrating by means of a lens and projecting through the liquid a strong beam of light. If looked at from the side against a dark background, the light-ray will appear turbid having a greenish shimmer in the case of gold or silver sols. A further test is the behaviour of the sol towards electrolytes. To do this, it is only necessary to add a few drops of a salt solution, when a marked change follows. The solutions become turbid, change colour, and the dissolved substance settles out. The best electrolyte for the ferric hydroxide sol is sodium sulphate, and, if added when the solution is hot, the hydroxide quickly comes down as a flocculent mass. The sulphides of barium and calcium are the best electrolytes to add to metallic or sulphide sols, but in the case of gold and silver sols the action is slow.

The ray of light test is called sometimes the Tyndall reaction. If the cone of light produced in a sol be examined with a suitably placed analyser, it will be found to be polarized. The curious blue light produced in a solution of quinine sulphate, under similar conditions, is not polarized, and this fact serves to illustrate the difference between the reflected light from a colloidal solution

and true fluorescence. The phenomenon has been investigated mathematically, and it appears that the particles, in colloidal solutions, reflecting the light must be small compared with the wave length of light, that is, less than 760 millionths of a millimetre in size. Indirectly, this indicates the nature of the colloidal state when in solution and is confirmed by direct attempts to measure the size of the particles or aggregates, by means of specially prepared filters of compressed collodion or gelatine in which the diameter of the pores is known. These lie between 21 and 930 millionths of a millimetre, and indicate the limits for the sizes of the particles held back by such filters. If the particles are retained, they presumably are larger than the pores and, if they pass through, they must be smaller than the pores. Corroborative evidence as to the nature and size of the particles in colloidal solutions is obtained by means of the ultra-microscope of Zsigmondy, but, in the organic sols, even by this means only a diffused light is recognizable. This failure to see and measure the particles in a number of sols may be due either to the very small size of the particles, or to their having a refractive index very near to that of the liquid. From investigations on these lines, it is deducible that colloidal solutions contain particles of sizes greatly exceeding molecular dimensions, and the fact constitutes one of the fundamental differences between colloidal and true solutions. A knowledge of the sizes of the colloidal particles, when in so-called solution, does not explain the differences between the different types of colloids. These differences are equally marked as regards the behaviour towards electrolytes, which precipitate the inorganic type readily in small quantities, but have little effect on many organic colloids, even in large quantities. The presence of actual particles in colloidal solutions suggests the use of the expression "disperse phase" to describe the condition of a colloiddally dissolved substance, and of "continuous phase" to describe the solvent. The use of these terms is general and convenient as emphasizing the fact that colloidal solutions are really systems of two phases; it, moreover, permits of the conception that the disperse phase of a sol may consist of either liquid or solid particles, and explains some of the differences between the two main types of colloids.

The true value or meaning of the foregoing conception will be more apparent if we think of the physical property of viscosity which is associated intimately with all colloids. In fact, all colloidal solutions divide themselves into two classes. One class,



such as the metallic and sulphide sols, shows a viscosity only very little higher than that of water. The other class, comprising organic colloids like gum-arabic, agar, gelatine and albumin, shows a marked increase of viscosity, even though the percentage of dissolved matter be small. The distinction probably lies in the fact that in those colloids which show a low viscosity, the disperse phase is present as solid particles; while in the sols with a high viscosity the disperse phase is liquid. Mathematical analyses of the conditions confirm this view, as they show that the presence of solid particles in a liquid can only raise the viscosity by small amounts proportional to the volume of solid matter present; on the other hand, since a small percentage of apparently solid matter, like agar, raises the viscosity some hundred times, it follows that the disperse phase in these cases cannot be solid. Those systems in which solid particles of microscopic size are distributed through a liquid are called suspensions, while those having two liquid phases are called emulsions. All colloidal sols belong to one or other of these two classes, and they are sometimes spoken of respectively as lyophobic and lyophilic colloids, that is, those which remain reluctantly and those which remain freely in solution. Generally speaking, the suspensions display a much more uniform behaviour towards various influences than do the emulsions.

The rapidity with which suspensions will clear or settle is capable of calculation by a formula suggested by Stokes more than sixty years ago. It gives the velocity in centimetres per second, and reads thus:

$$V = \frac{2r^2 (s-s') g}{9m}$$

In this formula  $r$  is the radius of the particle,  $s$  is the specific gravity of the particle,  $s'$  is the specific gravity of the liquid,  $g$  is the gravity constant, and  $m$  is the viscosity coefficient of the liquid. A momentary glance at the formula will show that, other things being equal, the velocity of the particle will be proportional to the square of its radius. Say a particle of gold has a diameter of 0.02 micron, then  $r$  is  $10^{-6}$  in centimetres; if we give  $s$  a value of 3 and take  $s'$  to be water or 1, also  $g$  to be 980, and  $m$  to be 0.01, then we get the formula to work out as giving the value of  $v$  or the velocity to be 0.00154 mm. per hour, or 1.1 mm. in a month. Had the gold particle been 2 microns in diameter and its gravity 19.3, then its velocity in settling would have been about 0.04 mm. per second, which is fairly rapid clearing. It is evident from this that, provided the particles are small and not much heavier

than the liquid, a suspension may take a long time to show any marked clearing; and even when it has cleared it can be transformed back to its original condition by shaking. The situation is, however, not quite so clear as it looks, since a number of sols undergo irreversible change, and no amount of shaking will transform them back. This compels us to conclude that mere questions of gravity and viscosity do not explain wholly the behaviour of the particles in a colloidal solution, and that we must look to other influences. The two influences which suggest inquiry are the fact that all these colloidal particles are in motion, and that each particle is electrically charged.

The movement associated with colloidal particles is the so-called Brownian movement, which is due to the impact of the molecules of the liquid on the particles; it is itself determined by two constants of the liquid, namely, viscosity and temperature, and by the diameter of the particles. It is, however, independent of the mass of the particles. Brownian movement of colloidal particles is insufficient to explain the stability of sols, as particles showing definite but moderate movements both can and do settle with some rapidity. The stability of sols seems rather to be connected with the electric charge of the particles.

Why and how a particle becomes electrically charged is a mystery, but the fact is known that any substance in contact with water and many other liquids acquires an electric charge. In most cases it is negative charging, especially in contact with water; further, the charge can be varied or reversed by the addition of electrolytes, or even become zero under suitable concentrations. By virtue of the electric charging of their particles sols are peculiarly unstable and tend to precipitate. The effect of the electric charge on the particles in a suspension can be demonstrated readily in a drop of the liquid under a cover glass, provided with a pair of platinum electrodes in contact with the drop and connected to a battery or accumulator. If a proper ultra-condenser be used, the particles can be seen to travel if negatively charged to the anode, and if positively charged to the kathode. The measure of the charge is calculated from or expressed by the difference in the voltage divided by the distance apart of the electrodes. No matter what the material, the charge carried by a particle seems to be much the same.

At an earlier stage of this article one gave examples of how to prepare some colloidal solutions or sols; in them all the essential idea is the reduction or the production of a sulphide by a suitable

reaction in very dilute solution. The existence of the electric chargeability of the particles permits of the production of sols by what may be termed disintegration methods. With suitably graduated electrodes, strength of current and cooled liquids, sols of many metals can be made by producing a small electric arc between electrodes of the metal which is to be dispersed under water. Instead of water cooled organic liquids like pentane, ether and isobutylalcohol may be used, and sols of such metals as strontium and barium may be made. Most of these sols are of the same colour as the vapour of the metal. In other cases after preliminary fine grinding, prolonged alternate treatment with alkali and acid and then contact with water reduces metals of the bismuth and chromium group to so fine a state that they form sols at once. In a few cases no treatment is needed at all. Lead forms a sol at once on contact with distilled water, but, unless oxygen be excluded, the dissolved lead becomes quickly the hydroxide. Other familiar examples are the formation of silver or copper sols by boiling distilled water in silver or copper vessels.

The chief interest of the electric charge associated with particles in suspension is the fact that the first step in their coagulation is the neutralization of their electric charges by that of the oppositely charged ions of the electrolyte. As most suspensions are negatively charged the kat-ion of the electrolyte is the active ion. To produce coagulation the electrolyte has to be present in definite concentration. A good deal of work has been done to determine the minimum concentration for various sols with a large range of electrolytes. The outcome of that work is that the quantity of electrolyte required depends only on the kat-ion, and that there are differences between salts containing kat-ions of different valency. Thus, the concentration required of monovalent kat-ions, such as those of potassium, sodium, lithium and hydrogen, is about eighty times greater than that of divalent kat-ions, like calcium, magnesium or barium, and 600 times greater than that of the trivalent kat-ion of aluminium. This series of facts is intelligible if we bear in mind that equivalent quantities of all ions carry the same charge, and are, therefore, able to neutralize the same amount of oppositely charged suspension particles. The phenomenon of coagulation is, therefore, also explicable in that when an electrolyte is added to a sol the particles are discharged and, as they no longer repel one another, are free to approach and form larger aggregates which settle down more or less rapidly.

Another interesting fact connected with this action of electro-

lytes in suspension is that the addition of a very small amount of a colloid of the emulsion class increases greatly the stability of the sol. Thus, by adding a little casein to the reagents it is possible to obtain sols of lead chromate and barium sulphate, which otherwise are not producible. The action of the added colloid is to make the suspension less sensitive to electrolytes, apparently because each particle of the suspension surrounds itself with a layer of the emulsion and becomes protected, or acquires then the electrical properties of the emulsion. A large number of these protective colloids is known, such as albumin, gelatine, casein, isinglass, &c., and various products of the hydrolysis of albumin, like protalbinic and lysalbinic acid. The latter are peculiarly active in giving stability to sols of the metals. This protective effect of the emulsions varies within wide limits, and for protecting a gold sol from coagulation by a given quantity of sodium chloride, has been found to be 0.005 for gelatine, 0.02 for isinglass, 0.2 for albumin, 12 for dextrin, and 25 for potato starch; these figures are currently spoken of as the "gold values" of the colloids.

The foregoing references to the protective action of certain colloids of the emulsion series brings us to a consideration of the emulsions as a group. These are essentially systems of two liquid phases or dispersions of one liquid in another, whereas the sols we have considered so far were suspensions, or systems of solid or rigid particles in a liquid. The emulsions are to be met with either naturally or artificially. A typical example of the former is milk, and of the latter is the condensed water from a steam engine, or the wool washings from a Bradford factory. In these emulsions, the oil globules show active Brownian movements, are coagulated by electrolytes, are non-diffusible, and also held back by ultra filters. Provided an emulsion or system of two liquid phases contains only a small percentage of widely separated particles, it differs in no material respect from similar systems with rigid particles. If, however, the percentage of dispersement increases, certain important differences appear. Seventy-five per cent of rigid particles in a solvent produces a paste, not a liquid; if the particles be liquid spheres, these are so easily deformed that the whole system retains the character of a liquid, even though the percentage of disperse phase approach nearly to unity. Emulsions containing such high percentages of disperse phase are possible only provided the continuous phase be a soap. All these solutions froth readily, and this frothing is a definite indication of a reduction of the surface tension of the solvent by the dissolved substance; in fact,

emulsification is possible only provided there is a lowering of interfacial tension between the two phases. Fill a pipette with oil and submerge its outlet in water or other liquid. The oil drops will rise to the surface of the water or liquid, but their size and number will depend on the respective specific gravities of the two liquids and on the surface tension at the circumference of the point outlet. If the tension decreases, the number of drops issuing increases, but the size of each diminishes. Test the difference when the outlet is submerged under water as compared with a corresponding submergence under soap solution. In the latter the number of drops issuing will be infinitely greater, but the size of each will be less. We can conceive, therefore, that the oil globules in high percentage emulsions are so close together that they are no longer spherical but polyhedral, the adjoining faces being separated by very thin films. These films would tear if they had the high surface tension of water, but do not tear provided the interfacial tension is lowered by certain dissolved substances such as soap. The stability of emulsions made in this way varies, and is destroyed by the addition of anything which affects the emulsifying agent; thus, an acid, by decomposing the soap, destroys an emulsion made with soap solution. The two phases can also be separated by centrifugalizing as with milk, or even by an electric current, owing to the oil globules being almost always negatively charged.

Among the inorganic emulsions, the only one of importance is silicic acid. If a solution of sodium silicate be decomposed by an excess of hydrochloric acid and the mixture be dialysed until the free acid and the sodium chloride be removed, there remains a clear colourless sol of silicic acid. This sol, either spontaneously or on addition of electrolytes such as phosphates or carbonates, sets to a bluish transparent gel. The curious thing here is that no water separates, and the gel contains as much water as the sol; moreover, the gel cannot be re-dissolved, and the increase of viscosity is continuous until the gel becomes immovable.

There are many organic emulsions such as albumin, gelatine, casein, agar, starch, cellulose, soap and the gums. Gelatine and agar interest us as doctors. The former is a protein, while the latter is a carbohydrate. Both, if immersed in cold water, swell and absorb large quantities of the water until equilibrium is reached. If heated, they dissolve to sols, gelatine at  $35^{\circ}$  C., and agar at  $99^{\circ}$  C. On cooling, both set to jellies, the setting point for gelatine being but a few degrees below the melting point, whereas agar cools to  $35^{\circ}$  C. before setting. The process is reversible in both cases, but the

gels must be heated to original temperatures before the sols form again. The transformation is continuous as in the case of silicic acid. The nature of the gelatine soil is somewhat obscure but its general behaviour suggests that it is a system of two liquid phases, or that it consists of globules of high gelatine content, in a continuous phase which is really gelatine in dilute solution. On this assumption, the process of sol formation is really a process of imbibition accompanied by disintegration. The conception is difficult, but may be easier if the system be thought of as one of two liquid phases, in which there is a marked facility by which the solvent is shifted from one phase to the other.

If we examine the albumins, we find they behave somewhat differently. Take egg-albumin; it is soluble in water at ordinary temperatures and does not form a gel either on cooling or with increasing concentration. It, however, coagulates irreversibly on heating to 60° C. The most curious feature about the albumin sol is its behaviour to salts in the cold; on the addition of salts in suitable concentrations, the sol becomes turbid and settles out in flocculent masses. The gel or coagulum behaves differently according to what salts are used. Magnesium and alkali salts produce coagulation only in high concentrations and the process is reversible, as on dilution or removal of the salt a sol is remade. If salts of the alkaline earths be used in similar concentrations, the precipitate or coagulum is insoluble; also, salts of the heavy metals, in even very low concentrations, will coagulate albumin irreversibly. The foregoing reactions are all with salts having different kat-ions, but in the case of salts which have the same kat-ion but different an-ions, it is found that tribasic acid salts coagulate out albumin in much lower concentrations than do the dibasic, and the latter in lower concentrations than the monobasic. The results are not the same with gelatine or agar. A citrate or a tartrate added to a gelatine or agar sol raises the setting point and produces a stiffer gel. If enough thiocyanate be added to a gelatine or agar sol, it will not form a gel at all. These discordant reactions cannot be explained on the basis of a mere chemical action; the accepted view is that they are all various manifestations of a change in the distribution of water between the two phases, and of the effects of the salts in altering the compressibility of water. The more exact bearing of this last factor will be referred to again, when discussing the solution of emulsions and certain phenomena connected with gels.

If the reader has followed the preceding statements, he will

have gathered that gelatine and agar set to gels, without separation of water, below certain temperatures, while albumin coagulates irreversibly above a certain temperature. All the emulsions, however, do not behave in the same way; in fact, many do not exhibit either of these characteristics, since they neither form gels at low temperatures nor coagulate on heating. Among this class are all the emulsions in solvents other than water, and many aqueous sols such as those made by the gums and starches and also of casein. In all this group there is an absence of discontinuity at either extreme of temperature; we see this in gum-arabic as a typical example. Gum-arabic can be salted out by large concentrations of sodium chloride, the whole reaction being due to the removal of water from one phase into the other. Among the sols with continuous phases other than water, are the sols of cellulose and its nitro-derivatives. All these show typical emulsion properties: that is, very high but inconstant viscosities and slight turbidity or opalescence, together with the formation of coherent gels on either neutralizing or removing the solvent.

From what has been said as to the effects of salts upon, and related phenomena presented by the emulsions, it is not surprising to find a difference between them and the suspensions in respect of the electrical conditions of the particles. The electric properties of the emulsions are more ambiguous than those of the suspensions and appear to be determined by the reaction of the dispersion medium, that is by the concentration of the hydrogen and hydroxyl ions. The conditions are much more complicated than in the suspensions, as many of the substances are very sensitive to added electrolytes. As an example one may quote the case of albumin. If freed from electrolytes by prolonged dialysis and alternate freezing and thawing, albumin is not electrically charged; but in the presence of acids it assumes a positive charge, and in the presence of alkalis a strong negative one. In respect of their optical behaviour the emulsions are all slightly turbid or opalescent, and give a marked Tyndall light reaction, but even under the ultra-microscope, they show no particles, but only diffused light.

All these facts indicate a sharp distinction between the suspensions and the emulsions, but there is a very gradual transition from these last to the true solutions. This transition is presented by a number of semi-colloids, such as the soaps. In dilute aqueous solution the soaps show a lowering of vapour tension which decreases with increasing concentration until, at about 28 per cent of concentration, it disappears and we get a typical emulsion

sol, setting to a jelly on cooling and coagulating on the addition of salts. In alcoholic solution the soaps show normal raising of the boiling point and all the characteristics of true solutions. Tannin is another example; its aqueous solution is turbid, froths, is non-diffusible and shows no lowering of the freezing point, yet, in acetic acid it is in true solution. The peptones present similar transition characters, the only features which link them to the emulsions being their turbidity and the syrupy nature of their higher concentrations. Many of the dyes present similar anomalous features. Thus eosin and methylene blue diffuse and lower the freezing point normally, but under the ultra-microscope are devoid of particles; yet others, like Congo-red or benzo-purpurin show particles but do not diffuse. Fuchsin approaches closely to the emulsion characters as, in concentrated solutions, it forms membranes on the surface and can be salted out by sodium chloride.

When speaking of the gels of gelatine, agar and silicic acid, stress was laid on the fact that these gels contain large amounts of water; in spite of that, these gels have some of the properties of solids. The pure gels, if left in air, rapidly lose water but still retain considerable amounts. Exhaustive experiments by Van Bemmelen show that there are no definite hydrates formed, but that there is a continuous loss of water and an equilibrium corresponding to every vapour tension. In this feature the gels stand out distinct from the crystals with water of crystallization. This indicates that, in the gels, we have a class of compounds which are quite definite under given conditions, but in which the proportion of the constituents can change continuously, and not only by steps corresponding to simple ratios. Rigid gels, like silicic acid, change in appearance during drying, but an elastic gel, like a photographic gelatine film, does not become opaque at any stage of the imbibition or drying process. So again, a gelatine film does not take up the same amount of water from a saturated atmosphere as it does by immersion in water. This faculty of absorption of water by elastic gels and the volume changes associated with it are of importance physiologically. The salient facts are: When an elastic gel is placed in water the gel imbibes some of it and swells, but the total volume of the gel decreases. This fact shows that the process is accompanied by compression and that the converse process of swelling must be accompanied by the liberation of heat. Experiments made by many observers show that a gramme of the following elastic gels produce the following gramme-calories of heat: gelatine, 5·7, starch, 6·6, gum-arabic, 9·0, and gum tragacanth, 10·3.



In this swelling of a gel, not only is heat generated but an enormous energy is manifested; thus, a gel of laminaria expanded 16 per cent of its volume against a pressure of over forty-two atmospheres, while with a pressure of one atmosphere it expanded 330 per cent.

If gels are not strained they are isotropic, that means they have the same coefficient of expansion, modulus of elasticity and refractive index in all directions. The coefficient of expansion is practically that of the liquid contained in the gel. Should, however, a gel be strained as by stretching it shows some anomalies; on rapid warming it contracts and expands on rapid cooling. This is true of india-rubber and may have a practical bearing upon our storage system in India of rubber articles for field ambulances and other medical units. Another interesting fact is, that gels are deformed without any change of volume; here, as in thermal expansion, the properties of the liquid portion of the gel are dominant. Under stress, normally isotropic gels become doubly refracting; this is a feature which they share with solids like glass, and can be used as a means to study their elastic qualities.

Evidence of structure in gels is difficult to obtain, that is direct evidence. One has already defined a gel as a system having a solid continuous phase which contains or encloses a liquid phase; the word "solid" is used here as meaning a much less deformable phase than the liquid phase, and must not be interpreted in the conventional sense. Some observers have thought to have noted a honeycomb structure in gels, but advanced work with the ultra-microscope suggests that the ultimate structure of a gel is not ultra- but rather a-microscopic. That gels have a skeletal structure is supported by facts already explained, and by the phenomena of diffusion in gels. The operations of ordinary photography bring this home to us, but in concentrated gels the rate of diffusion is much slower than in fairly dilute gels and still more so than in liquids. Further, it can be varied by the addition of various substances to the gel. This suggests that, dependent on the distribution of water between the two phases, the diffusion is concerned with the relative volumes of the gel walls and the free liquid, and that it is in the latter that the diffusion exclusively takes place. If one examines a photographic film, after development, under a high magnification, we see that the chemical reactions have not proceeded continuously, but that the picture is deposited in strata separated by apparently clear intervals. What the precise morphological basis of a gel is has yet to be determined, but there

is much to suggest that there is a closer a-microscopic analogy between a colloid and a crystal than their respective macroscopic appearances and physics indicate.

When discussing the electrical properties of particles in a suspension and the viscosity of a system of two liquid phases, emphasis was laid on the big part which large boundary surfaces played. We have now to consider some phenomena in which this surface is the determining factor, and which are explicable only as being due to changes of concentration in one phase at its boundary surface with another phase. A familiar example is the addition of some isinglass or white of egg by our cooks to clear our dinner soup; another is the use of charcoal to remove gases and noxious fumes. In both cases, certain substances are exposed to or brought in contact with large surfaces and there follows a concentration of the substances at those surfaces; this change in concentration is what is now called adsorption. When discussing emulsions, one referred to surface tension and inter-facial tension. This tension is a well-defined physical constant, and its measurement or manifestation depends on the tendency of the surface tension to reduce surface and so establish equilibrium with the other forces acting on the substance or body. As it involves work to produce or reduce a surface, it follows that surface energy is the product of surface tension into surface, and its reduction follows the reduction of either factor. Certain elaborate experiments, into details of which we need not go, have shown that the same reduction of surface tension follows a change in concentration of a substance at the boundary surface. This is true whether we are dealing with gases, solids, or liquids; in respect of the latter, the excess of alcohol to be found in the froth of an amyl alcohol solution is a simple example, as froth is a typical criterion of lowered surface tension. We, therefore, are in a position to affirm that the changes of concentration, spoken of as adsorption, on a surface are the outcome of the surface energy attaining a minimum value, and that they occur if an increased concentration leads to a reduced surface tension. Another fact has been experimentally demonstrated and that is, that a small amount of a dissolved substance can greatly lower surface tension, but can increase it but slightly. This anomalous statement is intelligible if we remember that surface tension manifests itself only in the surface layer and depends upon the composition of that layer. If more than one substance be present in a solution, they may not be adsorbed to the same extent, as there may be

selective action. Similarly, if a single compound is dissolved in a dissociating solvent, the ions may not be adsorbed equally; thus, if potassium sulphate be adsorbed by an agar gel, the resulting solution is usually acid because the potassium ion is adsorbed more than the  $\text{SO}_4$  ion. Other things being equal, the amount of a substance adsorbed is proportional to the active surface. Most of the materials used as adsorbents, such as kieselguhr and charcoal, present enormous surfaces. Whether adsorption proceeds to a definite end point or equilibrium has been the subject of exhaustive inquiry, both experimentally and mathematically. The adsorption isotherm, from those experiments, is practically a parabolic curve, and other things being constant, the amount adsorbed increases much more slowly than the concentration of the solution. The rule is deduced, from these inquiries, that the quantity of a substance adsorbed is expressible as the square root of the end or equilibrium concentration in the liquid after adsorption. This is tantamount to saying that, if double or treble the amount of a substance is to be adsorbed, then the remaining solution must be four or nine times as concentrated as for unit adsorption. Further and generally speaking, the order in which various substances are adsorbed is the same for different adsorbents, though the numerical ratios may be different. This does not cover the cases where a substance is soluble in more than one liquid, for the same substance is not adsorbed equally out of solutions in different solvents. That adsorption is much less in organic solvents than in water is well known and turned to practical use in removing substances adsorbed out of aqueous solutions. Thus, a dilute aqueous solution of crystal violet is completely decolorized by charcoal; if the latter be placed in alcohol, which has a lower adsorption coefficient, the surface concentration of the dye on the charcoal exceeds that necessary to establish equilibrium, and the bulk of the dye goes therefore into solution.

At this point one must ask the reader to go back to the statement that trivalent ions act in lower concentrations than divalent ions, and these again in weaker strengths than the monovalent, but that the amounts found in the precipitate are equivalent. In other words, for each trivalent ion, two divalent or three monovalent ions must be provided, as they carry the same electrical charges. It has been suggested that the first step in this is nothing more than an adsorption, and that the process can be referred to one and the same adsorption isotherm for all three. In other

words, given an adsorption curve, if the three ordinates of the curve are in the ratio 1, 2, 3, the corresponding abscissæ give the concentration necessary to allow the corresponding amounts to be adsorbed. The making of an adsorption curve is not always easy, but a comparatively simple way of determining the rate of adsorption of substances present in a solution can be carried out by allowing the solution to rise in long strips of filter paper. The dissolved substances are adsorbed by the fibre; consequently above a certain point the liquid in the paper consists of pure solvent only. Suppose we take a dilute solution of picric acid and turmeric, and allow it to rise up a strip of filter paper. The paper will be stained yellow, but if exposed to ammonia, only the lower part will be browned, showing that the turmeric had not risen as far as the picric acid. This simple method of observing adsorption is worth noting.

In considering adsorption, we have so far confined our attention to the influence of a change in surface energy, and disregarded the fact that limiting surfaces are the seats of electric charges. Though little is known as to how much the electric charges affect adsorption, the following fact is suggestive. If a solution of ferric hydroxide is passed through a column of purified sand, the hydroxide is retained, and only clear water escapes for a time. As the sand can retain only a definite quantity of hydroxide, there comes a time when the solution passes through unchanged. Now, ferric hydroxide is a positive colloid, therefore it is reasonable to assume that the positive colloid particles are discharged and held up by the negatively charged sand grains—silica assuming a negative charge in contact with water. It is interesting also to note that the clear water escaping from the sand is acid, showing that dissociation has occurred. Cases of both negative and positive adsorption are known, and also instances in which the an-ion and the kat-ion are not adsorbed equally; in most cases there is an excess adsorption of the kat-ion. An instance has already been given in the case of potassium sulphate.

Although this article has grown into one longer than was intended, the reader must pardon an attempt to summarize the general situation as to our knowledge of colloids. One has endeavoured to explain the distinction between systems in which the disperse phase consists of solid or rigid particles, and those in which both the disperse and continuous phases are liquid; the particles in the latter disperse being deformable. In the former we found the suspensions and other sols resembling closely the

suspensions. In systems of two liquid phases we found their main difference from the suspensions lay in the deformability of the particles and the greater range of phase ratio. This phase ratio, or large volume of disperse with a small volume of continuous phase, is the very essence of high viscosity, and finds itself represented by the emulsions and allied types of sol. Another feature of this group is the ready displacement of solvent from one phase into the other, and to this characteristic most of the features of the emulsions are due.

In the emulsion gels, like gelatine, agar, and silicic acid, we found systems in which the continuous phase is solid or less deformable, and furnishing a skeleton or network filled with liquid. In these gels the influence of surface is marked, and their characteristic properties are due to it. Associated with the properties of surfaces, we found the phenomenon of adsorption or increased concentration on limiting surfaces. That concentration was shown to depend on two forms of energy inseparable from such surfaces, namely, electric and surface energy.

The appreciation of the complex phenomena associated with the colloids goes far to explain many fundamental physiological phenomena. In a similar way the study of adsorption helps to clear up a number of obscure questions in a variety of fields, from the properties of soil in agriculture, through the corresponding properties of filter beds, down to questions associated with the nature of the latent image in a Kodak film. On the commercial side many of the features presented by the colloids and their gels are of the first importance. One has incidentally referred in the course of the article to the preparation of artificial silk, and if another instance be demanded, one can add the practicability of making squirted filaments of the refractory metals for incandescent lamps as an outcome of the discovery how to prepare the extremely finely divided metal coagulated from its sol. In the industries which deal with raw organic material, such as dye works, brewing, tanning, and the making of explosives from cellulose and its derivatives, the understanding and study of the colloids provides a new outlook. To the doctor the applicability of the facts and ideas connected with the colloids must strike him on every page, ranging as they do from the preparation of bacteriological media, through the physiology of man and plants, to an understanding of the potentiality of that gynaecological asset, the laminaria tent. In spite of its length and unavoidable technicalities, one can but hope that the labour spent in the preparation of this article may

not have been in vain. One's object has been to summarize modern knowledge as to a series of substances only now beginning to be understood, and a knowledge lying somewhat outside the ordinary path. This work aims to understand the colloidal state—a state in which, by appropriate methods, practically any substance may be obtained. Under modern conceptions the colloidal state is one of such fine subdivision that certain factors which depend on the properties of surface assume preponderance, owing to the increase of surface due to the subdivision. Modern science does not know colloidal matter or colloids in Graham's sense; it knows only types of colloidal solutions. It is evident that speculations about the chemical constitution of these singular bodies cannot be expected to advance our general knowledge of the colloidal state; progress in this field can only come by the application of physical methods. To give some insight into what is being done in this direction is the object of this article. It may not be appreciated by all, but to the few it should not be without interest, nor unproductive of new ideas.

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# MORPHOLOGY OF VARIOUS STRAINS OF THE TRYPANOSOME CAUSING DISEASE IN MAN IN NYASALAND—THE WILD GAME STRAIN.<sup>1</sup>

BY SURGEON-GENERAL SIR DAVID BRUCE, C.B., F.R.S.; MAJORS DAVID HARVEY AND A. E. HAMERTON, D.S.O., R.A.M.C.; AND LADY BRUCE, R.R.C.

## INTRODUCTION.

TRYPANOSOMES of this species, isolated from five antelope, are here described and compared with the human strains which formed the subject of a previous paper.<sup>2</sup> The wild game strains were isolated by injecting blood of antelope into susceptible animals. The blood was, as a rule, injected into a healthy goat, monkey and dog, and from these other animals were inoculated.

Trypanosomes from the following species were studied: Reedbuck, waterbuck, oribi, and hartebeeste. In these experiments, with the exception of the oribi, the three inoculated animals became infected. In the case of the oribi the blood was inoculated into a monkey and a dog, no goat being available, and the monkey alone took the disease.

### (1) MORPHOLOGY OF STRAIN I, REEDBUCK.

The following table gives the average length of this trypanosome as found in the rat, 500 trypanosomes in all, and also the length of the longest and shortest:—

TABLE I.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF STRAIN I, REEDBUCK.

Date	Method of fixing	Method of staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	21·7	34·0	16·0

<sup>1</sup> Reprinted from the *Proceedings of the Royal Society*, B., vol. lxxxvi.

<sup>2</sup> JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. xxi, p. 421.

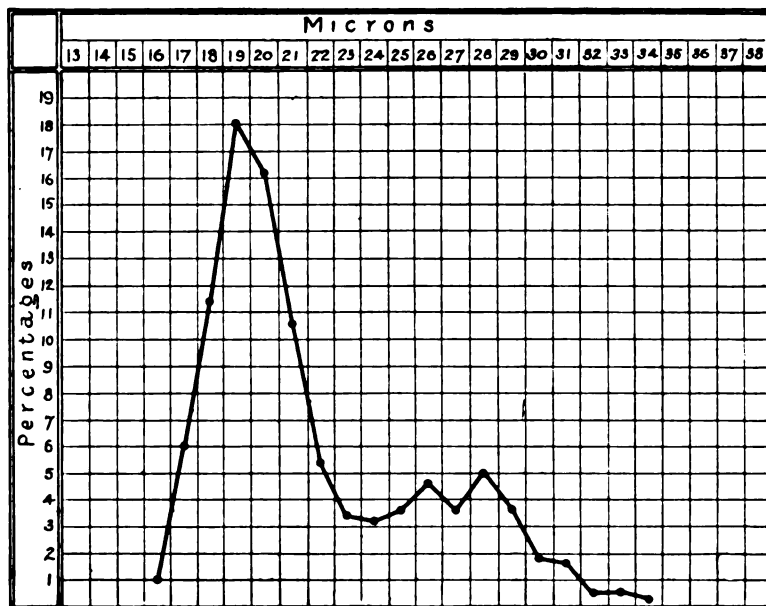
TABLE II.—DISTRIBUTION IN RESPECT TO LENGTH OF 500 INDIVIDUALS OF THE  
TRYPANOSOME OF STRAIN I, REEDBUCK.

			In microns									
			16	17	18	19	20	21	22	23	24	
Total	...	...	5	30	57	90	81	53	27	17	16	
Percentages	...	...	1.0	6.0	11.4	18.0	16.2	10.6	5.4	3.4	3.2	

			In microns									
			25	26	27	28	29	30	31	32	33	34
Total	...	...	18	23	18	25	18	9	8	2	2	1
Percentages	...	...	3.6	4.6	3.6	5.0	3.6	1.8	1.6	0.4	0.4	0.2

CHART 1.—Curve representing the Distribution, by Percentages, in respect to Length, of 500 Individuals of the Trypanosome of Strain I, Reedbuck, taken on nine consecutive days from Rat 847.





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TABLE III.—PERCENTAGES OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN I, REEDBUCK.

Date				Experiment No.	Animal	Percentage among short and stumpy forms
1912						
July 17	...	...	...	847	Rat	4
" 20	...	...	...	847	"	2
" 22	...	...	...	847	"	2
" 23	...	...	...	847	"	4
" 24	...	...	...	847	"	9
" 25	...	...	...	847	"	10
" 26	...	...	...	847	"	19
" 27	...	...	...	847	"	22
" 29	...	...	...	847	"	4
Average				...	...	8.4

## (2) MORPHOLOGY OF STRAIN II, WATERBUCK.

The following table gives the average length of this trypanosome as found in the rat, 500 trypanosomes in all, and also the length of the longest and shortest:—

TABLE IV.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF STRAIN II, WATERBUCK.

Date	Method of fixing	Method of staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	23.5	33.0	16.0

TABLE V.—DISTRIBUTION IN RESPECT TO LENGTH OF 500 INDIVIDUALS OF THE TRYPANOSOME OF STRAIN II, WATERBUCK.

				In microns									
				16	17	18	19	20	21	22	23	24	
Total	...	...	...	1	2	8	26	59	74	58	58	44	
Percentages	...	...	...	0.2	0.4	1.6	5.2	11.8	14.8	11.6	11.6	8.8	

				In microns									
				25	26	27	28	29	30	31	32	33	
Total	...	...	...	27	34	33	26	17	19	9	3	2	
Percentages	...	...	...	5.4	6.8	6.6	5.2	3.4	3.8	1.8	0.6	0.4	

CHART 2.—Curve representing the Distribution, by Percentages, in respect to Length, of 500 Individuals of the Trypanosome of Strain II, Waterbuck, taken on nine consecutive days from Rat 1,220.

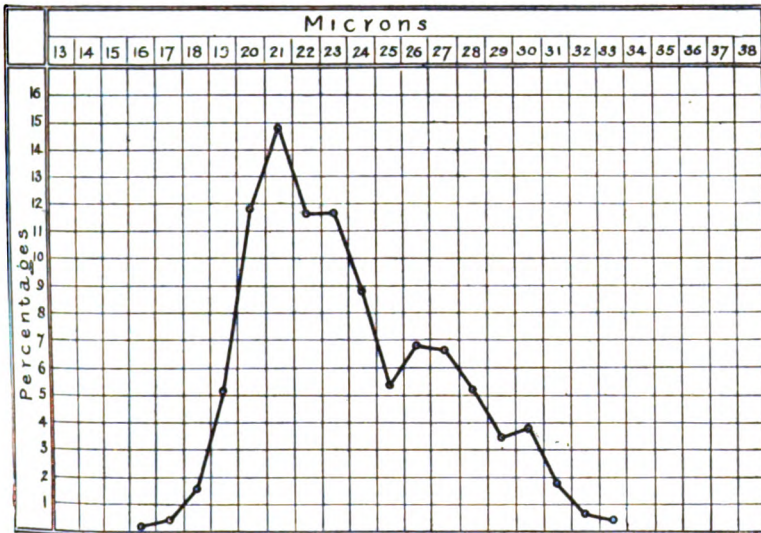


TABLE VI.—PERCENTAGES OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN II, WATERBUCK.

Date	Experiment No.	Animal	Percentage among short and stumpy forms
1912			
September 7 ... ..	1,220	Rat	7
" 8 ... ..	1,220	"	2
" 12 ... ..	1,220	"	12
" 16 ... ..	1,220	"	48
" 17 ... ..	1,220	"	39
" 18 ... ..	1,220	"	45
" 19 ... ..	1,220	"	21
" 20 ... ..	1,220	"	50
" 23 ... ..	1,220	"	36
" 24 ... ..	1,220	"	47
Average ... ..			30.7

### (3) MORPHOLOGY OF STRAIN III, ORIBI.

The following table gives the average length of this trypanosome as found in the rat, 500 trypanosomes in all, and also the length of the longest and shortest :—

TABLE VII.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF STRAIN III, ORIBI.

Date	Method of fixing	Method of staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	21·6	33·0	16·0

TABLE VIII.—DISTRIBUTION IN RESPECT TO LENGTH OF 500 INDIVIDUALS OF THE TRYPANOSOME OF STRAIN III, ORIBI.

				In microns								
				16	17	18	19	20	21	22	23	24
Total ...	...	...	...	1	10	22	77	109	90	57	28	19
Percentages	...	...	...	0·2	2·0	4·4	15·4	21·8	18·0	11·4	5·6	3·8

				In microns								
				25	26	27	28	29	30	31	32	33
Total ...	...	...	...	23	15	21	14	6	5	2	—	1
Percentages	...	...	...	4·6	3·0	4·2	2·8	1·2	1·0	0·4	—	0·2

CHART 3.—Curve representing the Distribution, by Percentages, in respect to Length, of 500 Individuals of the Trypanosome of Strain III, Oribi, taken on nine consecutive days from Rat 992.

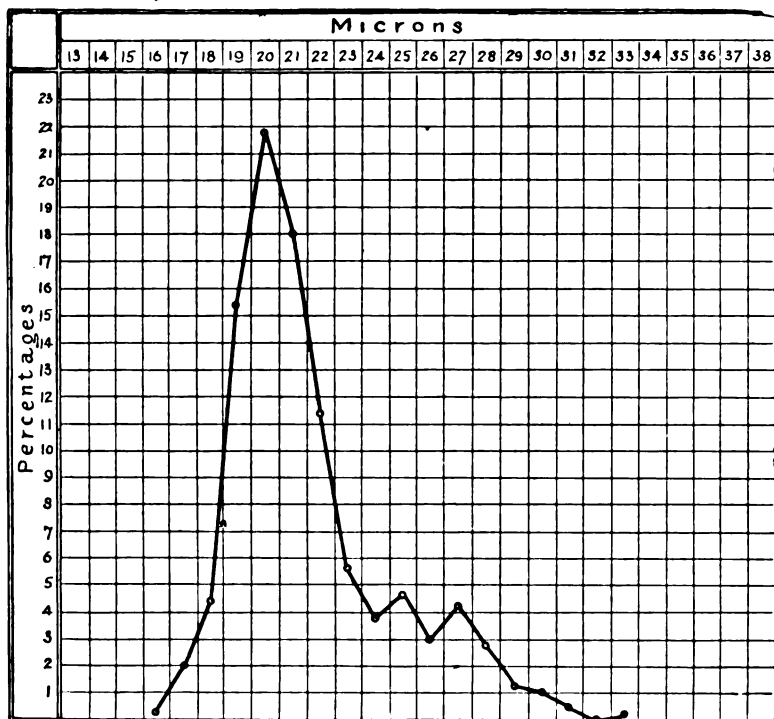


TABLE IX.—PERCENTAGES OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN III, ORIBI.

Date	Experiment No.	Animal	Percentage among short and stumpy forms
1912			
August 1 ... ..	992	Rat	12
" 2 ... ..	992	"	14
" 3 ... ..	992	"	10
" 5 ... ..	992	"	34
" 6 ... ..	992	"	15
" 7 ... ..	992	"	42
" 9 ... ..	992	"	29
" 10 ... ..	992	"	52
" 12 ... ..	992	"	42
" 13 ... ..	992	"	53
Average ... ..			30·3

(4) MORPHOLOGY OF STRAIN IV, HARTEBEESTE.

The following table gives the average length of this trypanosome as found in the rat, 500 trypanosomes in all, and also the length of the longest and shortest :—

TABLE X.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF STRAIN IV, HARTEBEESTE.

Date	Method of fixing	Method of staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	23·5	35·0	18·0

TABLE XI.—DISTRIBUTION IN RESPECT TO LENGTH OF 500 INDIVIDUALS OF THE TRYPANOSOME OF STRAIN IV, HARTEBEESTE.

	In microns									
	18	19	20	21	22	23	24	25	26	
Total .. ...	1	12	53	80	92	53	46	45	28	
Percentages ... ..	0·2	2·4	10·6	16·0	18·4	10·6	9·2	9·0	5·6	

	In microns									
	27	28	29	30	31	32	33	34	35	
Total ... ..	25	21	10	19	6	6	2	—	1	
Percentages ... ..	5·0	4·2	2·0	3·8	1·2	1·2	0·4	—	0·2	

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CHART 4.—Curve respecting the Distribution, by Percentages, in respect to Length, of 500 Individuals of the Trypanosome of Strain IV, Hartebeeste, taken on nine consecutive days from Rat 849.

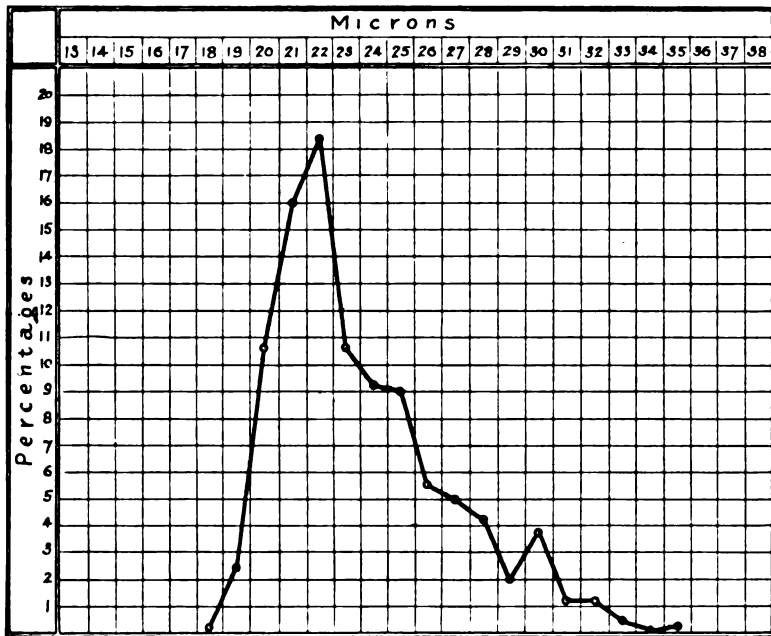


TABLE XII.—PERCENTAGES OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN IV, HARTEBEESTE.

Date		Experiment No.	Animal	Percentage among short and stumpy forms
1912				
July	19	...	...	...
	19	...	...	...
	20	...	...	...
	22	...	...	...
	23	...	...	...
	24	...	...	...
	26	...	...	...
	29	...	...	...
	30	...	...	...
	31	...	...	...
August	1	...	...	...
Average				28.3

## (5) MORPHOLOGY OF STRAIN V, HARTEBEESTE.

The following table gives the average length of this trypanosome as found in the rat, 500 trypanosomes in all, and also the length of the longest and shortest:—

TABLE XIII.--MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF STRAIN V, HARTEBEESTE.

Date	Method of fixing	Method of staining	In microns		
			Average length	Maximum length	Minimum length
1912	Osmic acid	Giemsa	22.6	34.0	15.0

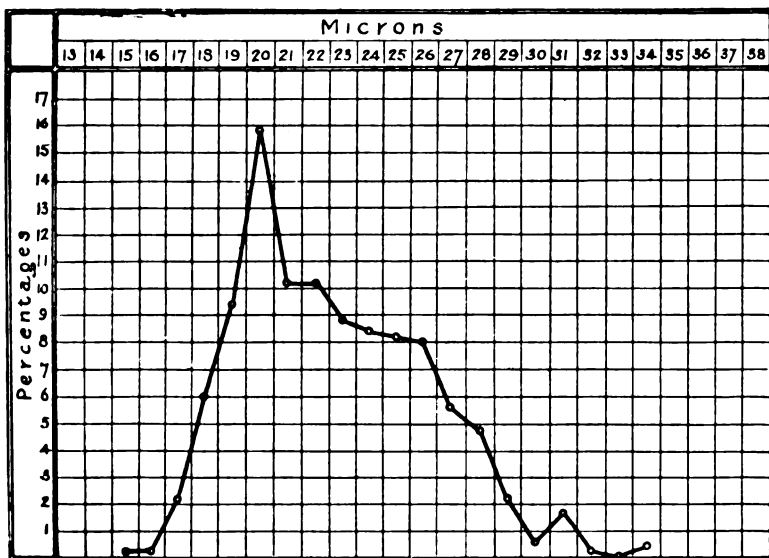
TABLE XIV.—DISTRIBUTION IN RESPECT TO LENGTH OF 500 INDIVIDUALS OF THE TRYPANOSOME OF STRAIN V, HARTEBEESTE.

	In microns									
	15	16	17	18	19	20	21	22	23	24
Total ...	1	1	11	30	47	79	51	51	44	37
Percentages ...	0.2	0.2	2.2	6.0	9.4	15.8	10.2	10.2	8.8	7.4

	In microns									
	25	26	27	28	29	30	31	32	33	34
Total ...	36	37	28	24	11	3	8	1	—	2
Percentages ...	7.2	7.0	5.6	4.8	2.2	0.6	1.6	0.2	—	0.4

CHART 5.—Curve representing the Distribution, by Percentages, in respect to Length, of 500 Individuals of the Trypanosome of Strain V, Hartebeeste, taken on nine consecutive days from Rat 1022.



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TABLE XV.—PERCENTAGES OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF STRAIN V, HARTEBEESTE.

Date	Experiment No.	Animal	Percentage among short and stumpy forms
1912			
August 21 ... ..	1,022	Rat	18
" 22 ... ..	1,022	"	7
" 23 ... ..	1,022	"	11
" 24 ... ..	1,022	"	30
" 26 ... ..	1,022	"	42
" 27 ... ..	1,022	"	55
" 28 ... ..	1,022	"	34
" 29 ... ..	1,022	"	54
September 2 ... ..	1,022	"	50
Average ... ..			33·4

## COMPARISON OF THE WILD GAME STRAINS WITH ONE ANOTHER.

TABLE XVI.—MEASUREMENTS OF THE LENGTH OF THE TRYPANOSOME OF THE WILD GAME STRAINS.

Date	Experiment No.	Animal	Number measured	From what animal	In microns		
					Average length	Maximum length	Minimum length
1912	783	Reedbuck	500	Rat	21·7	34·0	16·0
1912	1,180	Waterbuck	500	"	23·5	33·0	16·0
1912	863	Oribi ...	500	"	21·6	33·0	16·0
1912	799	Hartebeeste	500	"	23·5	35·0	18·0
1912	957	"	500	"	22·6	34·0	15·0
			2,500	Average	22·6	35·0	15·0

## COMPARISON OF THE CURVES OF THE WILD GAME STRAINS.

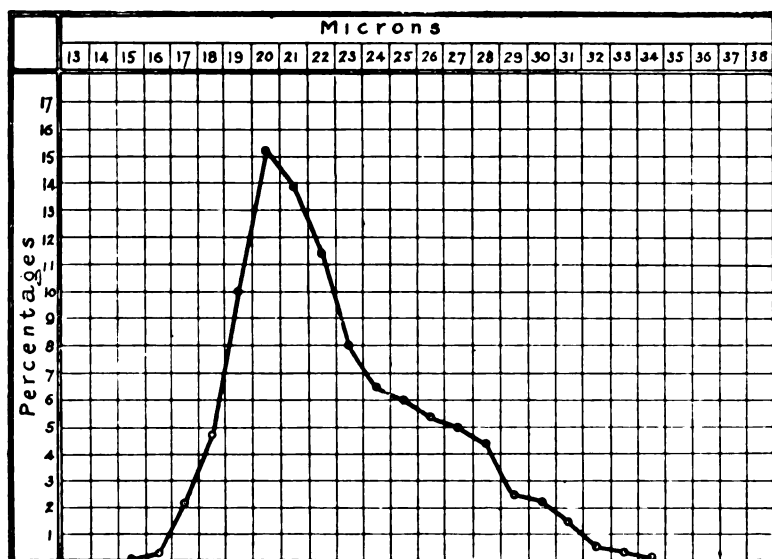
Unlike the curves of the human strains, these are all remarkably alike, and there can be little doubt that the same species of trypanosome is being dealt with in all five of the wild game strains. The wild game curves resemble strains II, IV, and V of the human strains, described in a former paper, and also those found by Kinghorn and Yorke in the Luangwa Valley.

TABLE XVII.—DISTRIBUTION IN RESPECT TO LENGTH OF 2,500 INDIVIDUALS OF THE TRYPANOSOME OF THE FIVE WILD GAME STRAINS.

	In microns									
	15	16	17	18	19	20	21	22	23	24
Total ...	1	8	53	118	252	381	348	285	200	162
Percentages ...	—	0·3	2·1	4·7	10·0	15·2	13·9	11·4	8·0	6·5

	In microns										
	25	26	27	28	29	30	31	32	33	34	35
Total ...	149	135	125	110	62	55	53	12	7	3	1
Percentages ...	6·0	5·4	5·0	4·4	2·5	2·2	1·5	0·5	0·3	0·1	—

CHART 6.—Composite Curve representing the Distribution, by Percentages, in respect to Length, of 2,500 Individuals of the Trypanosome of the Wild Game Strains.





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This composite curve resembles the human Strain II, E—.

TABLE XVIII.—COMPARISON OF THE PERCENTAGES OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPANOSOME OF THE FIVE WILD GAME STRAINS.

Date	Experiment No.	Animal	Percentage among short and stumpy forms
1912 ... ..	783	Reedbuck ... ..	8.4
1912 ... ..	1180	Waterbuck ... ..	30.7
1912 ... ..	863	Oribi... ..	30.3
1912 ... ..	779	Hartebeeste ... ..	28.3
1912 ... ..	957	„ ... ..	33.4
Average ... ..			26.2

It is evident from these tables and charts that the various strains of this trypanosome, as they occur in wild game, are remarkably alike. This is what might be expected. Here the trypanosome is at home: it is leading a natural life. It may be supposed to be saved from variation by constantly passing and repassing between the antelope and the tsetse-fly.

### COMPARISON OF THE HUMAN STRAIN WITH THE WILD GAME STRAIN.

TABLE XIX.—AVERAGE LENGTH OF THE TRYPANOSOME OF THE HUMAN AND WILD GAME STRAINS.

Strain	Number of trypanosomes measured	Animal	In microns		
			Average length	Maximum length	Minimum length
Human ... ..	3600	Rat	24.2	38.0	15.0
Wild-game ... ..	2500	„	22.6	35.0	15.0

The length of the trypanosomes of the human strain found in white rats only is included in this table, in order to permit of comparison with the wild game strain, which is also taken from rats.

The curves (Chart 7) differ from each other in such a marked manner as to be of no use in deciding as to the identity of the human and wild game strains. In spite of this, however, by a comparison of the two strains morphologically and by the susceptibility of the different experimental animals to their patho-

genic action, the Commission are driven for the present to the decision that the two strains belong to the same species of trypanosome.

CHART 7.—Curves representing the Distribution, by Percentages, in respect to Length, of 3,600 Individuals of the Trypanosome of the Human Strain, and 2,500 of the Wild Game Strain.

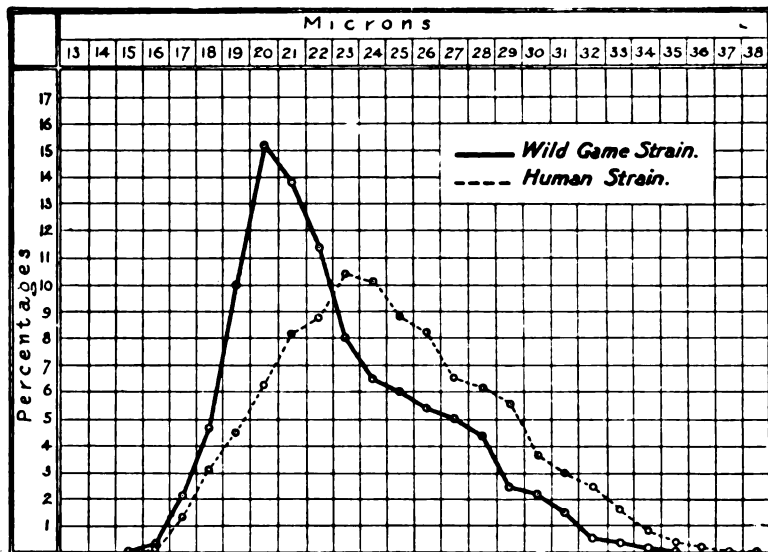


TABLE XX.—PERCENTAGES OF POSTERIOR-NUCLEAR FORMS FOUND AMONG THE SHORT AND STUMPY VARIETIES OF THE TRYPA NOSOME OF THE HUMAN AND WILD GAME STRAINS.

Date	Strain	Average, percentage	Maximum, percentage	Minimum, percentage
1912 ... ..	Human ... ..	21.1	52.0	2.0
1912 ... ..	Wild Game ... ..	26.2	33.4	8.4

#### CONCLUSIONS.

- (1) The five wild game strains resemble each other closely, and all belong to the same species of trypanosome.
- (2) The wild game strains and the human strains, although they differ to some extent, also belong to the same species.
- (3) This species is *T. rhodesiense* (Stephens and Fantham).
- (4) There is some reason for the belief that *T. rhodesiense* and *T. brucei* (Plimmer and Bradford) are one and the same species.

## A SUGGESTION AS TO A METHOD OF PREVENTING THE OCCURRENCE OF TYPHOID CARRIERS.

By CAPTAIN R. G. H. TATE.  
*Royal Army Medical Corps.*

As its title implies, this paper is of a purely suggestive nature and has been prepared solely for the purpose of drawing attention to what appears to the writer to be the weak point in the methods adopted at present for the prophylaxis and treatment of enterica (enteric fever and paratyphoid fever) when considered from the standpoint of carrier prevention.

The results of modern research would seem to have established the fact that infections by the micro-organisms producing this type of disease can only take place when a previous case of one of these maladies has occurred, either in the vicinity of the new victim, or in circumstances where the pre-existing case can have its infective matter conveyed to the next host. Again, it seems to have been proved that cases of these diseases are frequently more or less highly infectious for weeks after their apparent recovery, in some cases even for years.

Taking these facts as accepted, it seems obvious that as medical men, and especially as medical men attached to a community which is especially liable to the effects of a rapid transmission of infection on account of the close proximity to each other in which its members live, we should use every means in our power to prevent the spread of these diseases from one case to another. In peace, when segregation is feasible, there is but little chance of recognized cases or carriers infecting others, but in war time, when every available man of our little army may be needed in the firing line, segregation of carriers may prove to be undesirable to the last degree, while its effectual accomplishment, for strategic or other reasons, may be entirely impossible.

For these reasons we should aim at a course of prophylaxis and treatment by which we can insure the entire non-infectiveness of our patients on discharge from hospital.

Taking the stages in detail, during which those under our care may be treated, let us see if we can improve our present methods in each, taking simple, uncomplicated cases for consideration.

Firstly, we have the period before the arrival of the infective

matter, during which prophylactic measures will tend to prevent individuals from becoming storehouses for fresh infection in the future, which may be called the direct action of these efforts. That they have an indirect action in preventing those cases which have succumbed to infection, in spite of their application, from becoming carriers would seem possible if we consider the statistics given in the article by Colonel R. H. Firth, in the number of the *JOURNAL OF THE ROYAL ARMY MEDICAL CORPS* for August, 1912. Here we read that out of 1,229 cases of true enteric fever, which passed through the Enteric Convalescent Depots of Naini Tal and Wellington, roughly 2 per cent were found to be carriers, while out of 124 cases of recognized paratyphoid fever 14 per cent were found, chronic and temporary carriers being taken together.

Now argue the case as we may, the fact cannot be denied that here we have two diseases for one of which prophylactic inoculation is carried out, and for the second of which this measure is not adopted. In the former case we find a very small percentage of carriers, in the latter we find 14 per cent of these individuals.

While it must be admitted that we are not told how many of these true enteric cases had been inoculated, and that, therefore we cannot draw a hard and fast comparison between the two types of disease, still, knowing that the great majority of the troops in India in the period under consideration had been subjected to the treatment, we are justified in assuming that the greater number had been protected in this manner at some period of their service. Again we have the fact of a severe disease producing sequelæ of shorter duration than those of an apparently much milder one.

Supposing that preventive inoculation has had something to do with the inhibition of the carrier condition, it is interesting to surmise how this result can have been arrived at, although we cannot advance anything but pure conjecture at present as to the cause of this phenomenon. It may be that the products of the inoculation in the blood of the individual may have been sufficiently strong to reduce the number or virulence of the invading micro-organisms immediately after their entry into the blood, though not sufficient to entirely obliterate them or, perhaps, that inoculation may have so acted on the recipient's organization that, although it could not resist the attack successfully, the causative organism of the disease could not effect a permanent lodgment.

However the result has been arrived at, the possibility that preventive inoculation may have had something to do with its

production should not be entirely forgotten, and for this reason, if for no other, everything that can be done to supply us with a vaccine protective against the paratyphoid infections, as well as against *Bacillus typhosus*, should be attempted, although the result of recent work on this subject would not lead us to believe that we are likely to be successful at present.

Secondly, turning to the period during which our patients come under our care as recognized cases of these diseases, let us ask ourselves what we are doing to prevent them from becoming carriers? The answer to this question, sad to relate, is "Nothing." This does not seem to be a satisfactory state of affairs in diseases of which we know the origin, and from which, as a rule, we can isolate the causative micro-organism.

Our sole line of treatment, as far as the actual enteric infection goes, consists in leaving the cure to Nature and giving the patient as little food as possible until a considerable period has elapsed after his temperature has fallen to normal. When we consider the individual only, the results of this course have proved satisfactory, but is it so when we remember the fact that this person may possibly become a source of infection to his associates after he leaves our wards?

To put it more plainly, is it right to leave a man, weakened as he must be by enforced starvation, with his powers of producing protective substances in his blood probably reduced by this same starvation, to become so saturated with the organisms of his disease that they are able to take up a prolonged or permanent residence in his tissues and thence infect others in only too many cases?

The reader may say that this state of affairs is to be deplored, no doubt, but that it is unavoidable, and so we must put up with it. The reply to such a remark is that we are not justified in saying that it is unavoidable until we have tried to prevent it, which we certainly have not done up to the present in any whole-hearted manner.

That there are signs of this inactivity coming to an end is evident when we read that one or two people have started giving vaccine injections in such cases, but the efforts made have been few and no investigation seems to have been carried out as to whether cases thus treated continued, after their apparent recovery from the infection, to secrete the organisms which produced their disease.

The weak point in this method of treating enterica up to date would appear to be that few have taken into account that we are

not dealing with one organism alone, but that *B. typhosus* or *B. paratyphosus* A may be present in different cases of these diseases.

While this fact tends to reduce the value of the results obtained, it also brings out a point which may prove useful to us in the treatment of our cases, which is that paratyphoid infections seem to derive benefit from the administrations of typhoid vaccines.

Knowing as we do that paratyphoid infections are comparatively common in India, it is very probable that some of the cases recorded by Major Smallman in 1908, and, possibly, some of those mentioned by Lieutenant-Colonel Carr and Captain MacArthur, last year, as having been benefited by the administration of stock anti-typhoid vaccine, were cases of paratyphoid fever, as no information as to the result of the bacteriological examination was given. In all of these cases we find improvement in the condition and increased comfort of the patient recorded.

Taking this fact with those recorded by Colonel Firth, in the article mentioned earlier in this paper, one cannot help thinking that there may be some intimate connexion between the reactions of the body to the *B. typhosus* and the paratyphoid organism.

Hence it may be that we have grounds for believing that a mixture of these organisms when given as a vaccine will act beneficially on a patient; at any rate, we have grounds for pursuing an investigation on these lines.

Having suggested the use of a mixed vaccine for the reasons given above, it should not be forgotten that we may obtain another valuable result by its use. Knowing as we do that it is impossible for us to say what is the causative micro-organism in a case of enteric infection until a comparatively lengthy process is gone through for the isolation of that body, and it having been proved that the bacilli are to be found in the blood-stream in the greatest numbers in the first few days of the attack, even if we do not agree with at least one investigator—Forster, of Strassburg—that they reach the intestinal and biliary passages through the blood not entering the patient's system from the intestine as was originally supposed, it is obvious that we should attack the invaders while they are in their most vulnerable position—i.e., as soon as possible after their entry into the body. Hence let us administer a mixed vaccine at the time when we draw off a sample of the patient's blood for diagnostic purposes. The reaction is so slight and of so transient a nature when small doses of vaccine, such as those used for curative purposes, are administered that it may be

looked on as negligible, and this line of treatment will put us in the position of having started our curative measures at the earliest possible moment; also, no harm will have been done if the culture proves negative. After a definite diagnosis has been arrived at we can make a vaccine from the patient's own organism and increase his resistance to that.

It may be asked what grounds are there for believing that this course of treatment will benefit our patient, when it has already been stated that efforts to produce a prophylactic vaccine for the paratyphoid A bacillus seem to have resulted in failure?

The two cases manifestly are very different; in a prophylactic vaccine treatment one aims at a high degree of immunization which will last for some time, in a curative treatment of a similar nature one aims at a rapid increase of resistance raised to such a pitch as to cure the patient, the duration of which is a matter of little importance. If we can raise an animal's resistance to a given micro-organism experimentally to a degree corresponding to the resistance produced by a pathological infection by that body, in a time which corresponds approximately to the period of time which elapses between the onset of the attack produced by that body and the cessation of its effects, it is reasonable to suppose that we are in a position to assist in the cure of the patient by raising his resistance by our course of treatment.

Having seen the conditions which our method must fulfil to be successful let us inquire whether we can attain them.

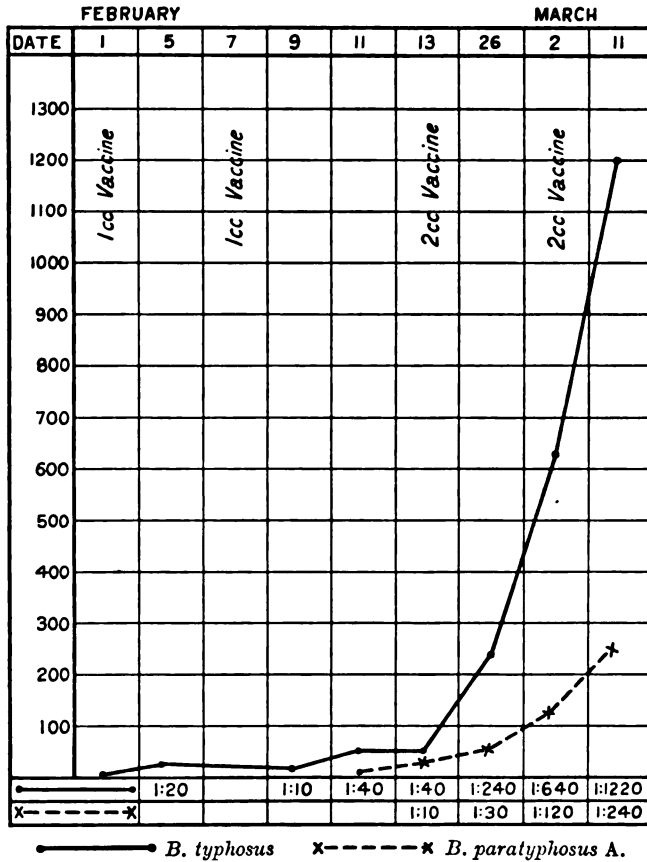
The first thing to consider is, can we raise the resistance of the individual to a point comparable to that produced by his disease? We know as the result of experience that it is comparatively easy to do so for the *B. typhosus*, and, turning to the article referred to before, we read that "Even under the most favourable circumstances the patient's serum rarely gives a positive (agglutination) reaction for the A variety of the paratyphoid micro-organism in a higher dilution than 1:100." Again, out of several hundred similar tests carried out by the writer in a brigade and divisional laboratory only two have been found to give positive results up to a dilution of 1:160 for this organism.

Admitting that the results of such a series of tests cannot be taken as a true index as to how agglutinins can be raised in this infection, as sera are sent in at all stages of the disease, yet their results tend to augment the value of the above statement.

It may be argued, also, that agglutinins are not a true index of the degree of resistance possessed by an individual, still, as

they seem to increase more or less regularly with that resistance, they may be taken as a rough guide for our purpose.

As to the time at our disposal for attaining our object we may take it that about three weeks, which would appear to be the average duration of the enteric infections, may be considered to represent it.



6 c.c. vaccine contained 500 million *B. typhosus* and 500 million *B. paratyphosus A.*

Charts given in the recent paper by Majors Cummins and Cumming, on the subject of the production of a prophylactic vaccine for paratyphoid A infections show that the conditions laid down can be fulfilled, though the dosage therein described is unsuitable for curative purposes for obvious reasons. The chart



shows the effect of administering a mixed vaccine of *B. typhosus* and *B. paratyphosus* A in equal proportions to a rabbit, and also tends to show that our object would appear to be attainable.

Although investigation has shown that the opsonic power of the serum of rabbits inoculated with *B. paratyphosus* A does not seem to be very high as compared with that produced when these animals are similarly treated with *B. typhosus*, still we are not justified in assuming that inoculation will not have a useful curative action until a systematic examination of the sera of cases of the disease shows us that these sera have a higher opsonic power than those whose opsonins have been raised by artificial means.

If success is to be obtained, investigation must be carried out to discover:—

(1) *What Type of Vaccine should be used.*—It would appear that this should be of a truly polyvalent nature, not only containing the two types of micro-organism under consideration but also several strains of each type.

(2) *How the Vaccine should be prepared.*—We know that vaccines are peculiarly sensitive to the effect of heat and that an otherwise perfect vaccine may have its power destroyed by a very slight deviation from the straight path in its preparation. We also know that the application of 0·5 per cent carbolic acid sterilizes and preserves a vaccine without the intervention of heat. Why, then, go through the double process of heating and adding a preservative antiseptic when the same result can be attained simply, safely and rapidly, by the addition of carbolic acid as above described?

The writer admits that his experience is but small on these matters, and on this account he brings the subject forward with diffidence, only doing so because his own very limited work in the preparation of vaccines leads him to believe that those prepared without sterilization by heat seem to have had more regular and quite as powerful effects as those in the preparation of which heat had been employed.

(3) *The Dose of the Vaccine.*—This is a question which only those of large experience can settle and that after experiments on actual cases. The results of doses given to healthy individuals will not afford a reliable guide as, when treating cases, we have to deal with persons who already have a large number of the micro-organisms in their system. Individual idiosyncrasy will also play an important rôle in this question.

(4) *The Spacing of the Doses of Vaccine.*—This question is largely bound up with the last, and can only be decided in the same

manner. From the curves in the chart it seems obvious that the results for neither organism are as good as they should be. The cause of this is probably to be found in badly estimated or improperly timed dosage.

Much delay in the production of curative vaccines for enterica would appear to have resulted from the idea which has got abroad that vaccines of *B. paratyphosus* A are very toxic. So far the writer has been unable to ascertain whence this belief has arisen. Surely the number of bacilli which Major Clements and Captain Galwey, R.A.M.C., claim to have given to a patient would have had a serious effect if the idea were true? The writer quite admits, as the result of many a weary effort ending in disappointment, that the production of a high titre serum for this bacillus in rabbits is one of the hardest things one has to do, but then the doses needed for the production of this serum are far in excess of those needed for our purpose.

Having got our vaccine, having regulated its doses and timed their application, let us make a routine practice of giving it to every case which looks like enteric, until it is proved not to be so, and let us see how many carriers will be found in five years. Many will probably exclaim at the idea of "promiscuous inoculations," as it has been described to the writer, but what reasons can be advanced against carrying out a course of treatment which entails no suffering for the patient, which is quite safe and does not interfere with any other treatment which the particular medical officer in charge of the case pins his faith to, and which may lead to very great benefit to the patient and those around him?

If this course is to be tried it is obvious that supplies of specially prepared vaccines will be needed, to produce which it is suggested that the existing staff of each of the present enteric convalescent depots be increased by medical officers, specially trained in this work.

Lastly, turning to those who have suffered from the diseases in question and have been discharged "cured," what is done for them to prevent their infecting others?

Nothing but isolation appears to be of any avail, drugs have failed, and to quote the words of the "Report on the Health of British Troops in India for 1912": "The treatment of carriers by means of autogenous bacillary emulsions . . . has been definitely found to be inoperative."

Surely this is a lesson for those who read it. Have we done all we can to prevent this state of affairs? Why did we not try those

same "bacillary emulsions" early in the disease, before the organisms had settled down in their victims' tissues, and see whether or not the carrier condition would have ensued? Suppose we had failed in our object we should have been no worse off than we are at present, but we should have gone one step further in our knowledge of these infections.

Though they have taught us much, though their work has been invaluable in preventing the spread of one of India's scourges among our army, no more effective monuments could have been erected to the insufficiency of our methods of treating enteric fevers than the two institutions at Naini Tal and Wellington.

It would appear that the time has come for these places to play a new rôle in addition to their present one in the fight against the enterica, that of supply depôts for the issue of curative vaccines, instead of allowing them to act solely as storehouses for the failures of our present system of treatment in preventing the occurrence of the carrier condition.

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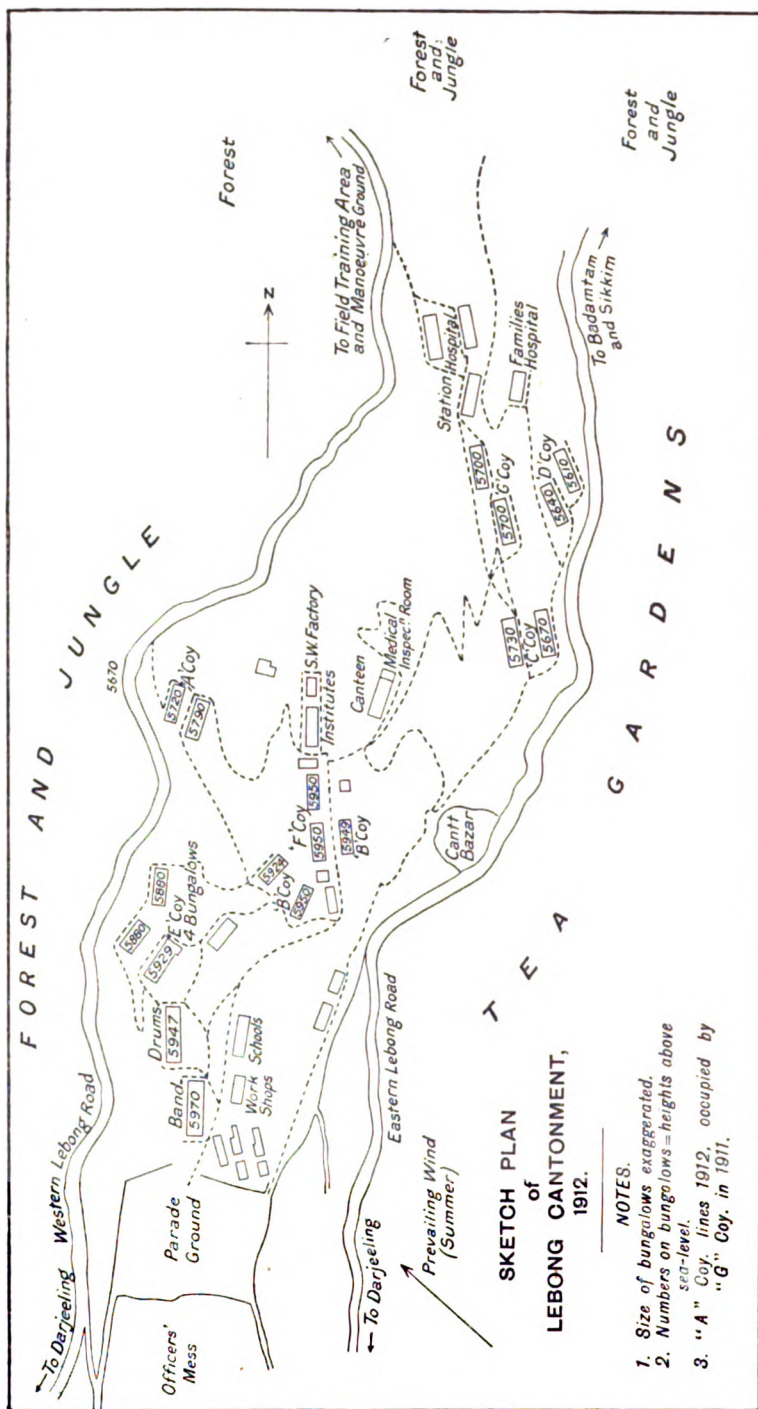
## SOME OBSERVATIONS UPON THIRTY-ONE CASES OF MULTIPLE PERIPHERAL NEURITIS AMONGST EUROPEAN TROOPS IN INDIA.

BY CAPTAIN R. C. PRIEST.  
*Royal Army Medical Corps.*

DURING the hot season of 1912 in Lebong, near Darjeeling, a disease with a somewhat obscure origin became prevalent amongst the men of the 3rd Battalion Middlesex Regiment; the same disease, it appears, was observed in the previous year amongst the men of the same regiment and, as far as could be ascertained, it was found that some of those affected seemed to recover completely after spending the winter in the plains (Calcutta), others had a relapse the following year, while some of those who returned to England, time expired, found their way to the hospitals in London. Of the latter no record of their ultimate fate has been obtained. In 1911, the symptoms of the complaint so closely resembled those of beri-beri, that the first cases were actually diagnosed as such, but after investigation the name of the disease was changed to multiple peripheral neuritis. It will be seen that the symptoms about to be described simulate those of early beri-beri, and the report of one fatal case of disordered action of the heart will show how closely related the two diseases are.

It should be borne in mind that the regiment had recently come from Singapore, where, I am informed, beri-beri or a closely related disease is common among the native inhabitants.

Before discussing the ætiological factors of this disease, it would be well briefly to point out the general features of the Lebong Cantonment, and the rough sketch-plan attached will assist the reader to appreciate the surroundings of the Lebong Spur and the bungalows situated thereon. The barrack bungalows are situated on a spur of the North Eastern Himalayas, a spur which juts out in a north-north-east direction, and is one of the terminations of a long ridge extending from Senchal through Katapahar, Jalapahar and Darjeeling to Lebong. The bungalows lie on the summit and upon the eastern and western slopes at varying heights above sea level, the highest one occupied by soldiers being "F" Company lines 5,950 ft., the lowest being "D" Company lines 5,640 ft. and 5,610 ft. on the eastern slope, i.e., a difference of over 300 ft. vertically and about half a mile horizontally. Below the Eastern



#### NOTES.

1. Size of bungalows exaggerated.
2. Numbers on bungalows = heights above sea-level.
3. "A" Coy. lines 1912, occupied by "G" Coy. in 1911.

Lebong road there are tea gardens along the entire extent of the cantonment, while below the opposite slope there is dense jungle and forest, which serves as an efficient shelter from any breeze ascending the slope. The grass and wormwood weed which surround the bungalows grow luxuriantly during the rains. The most northerly part of the spur is used as a training and manœuvre area, and here again jungle, long grass, scrub and forest are the natural conditions. The prevailing wind comes from the south-south-east, which brings with it rain and mist for the greater part of the time. Although, it will be observed, the amount of sun received by the bungalows would be about equal during the day, the bungalows on the western slope are sheltered from the south-south-east wind, and consequently the atmosphere is much more "steamy." The difference in atmospheric conditions between the two slopes is quite appreciable. The rainfall from March to October, 1912, was approximately 130 in., while the day temperature varied between 60° and 75° F. The humidity varied from 75 to 100 per cent.

#### ÆTIOLOGICAL FACTORS.

These are discussed on the same lines as those described for beri-beri in Sir Patrick Manson's textbook of "Tropical Diseases." Observations were made upon thirty-one cases in all, fifteen of which were fresh and sixteen were old cases, i.e., cases which had suffered during the previous year, but which had recovered sufficiently to do their duty while in Calcutta for the winter months.

*Age.*—Cases ranged between 19 and 27 years. No cases occurred amongst officers, non-commissioned officers, women and children.

*Alcohol.*—Five drank moderately at the time of observation, 10 had been heavy drinkers but were teetotallers while in the Service, 7 had been moderate drinkers but were teetotallers while in the Service, 9 had been teetotallers always.

These figures do not show that there is any relation between the amount of alcohol consumed and the disease in question.

*Venereal Disease.*—Two cases had been treated for syphilis; 2 cases had suffered from gonorrhœa.

*Smoking.*—Curiously enough, the soldier who smoked most heavily was one of the mildest cases. It might be said that nicotine tends to increase the heart symptoms, but these were very persistent even when the cases were kept in hospital.

*Other Diseases.*—The numbers which had been admitted for each of the following diseases were :—

## 176 *Observations upon Multiple Peripheral Neuritis*

Malaria, 10 ; diarrhoea, 4 (bill diarrhoea) ; scabies, 1 (twenty-one days in hospital) ; influenza, tonsillitis and boils were entries in one patient's M.H. Sheet ; while diarrhoea, dysentery, syphilis and malaria, were entries in another patient's M.H. Sheet. The last two cases were the worst and most resistant to treatment, showing that debilitating diseases tend to lessen the resistance to multiple peripheral neuritis.

*Food.*—It does not appear that the disease was connected with the food supply of troops, for, the rations being always of good quality and varied, the occurrence of these cases cannot be explained by the nitrogenous starvation theory. As regards rice, this was of the unpolished variety, and was not consumed in sufficiently large quantities to cause anxiety. Fresh vegetables were issued and the supply was varied. Cooking arrangements were satisfactory, and no utensils were "tinned." Unsound fish was never consumed, only reliable tinned fish from the coffee shop was procurable. There was not at any time any overcrowding in barrack rooms, and there was no prevalence of skin diseases such as scabies, pediculosis or any other parasitic diseases. Ventilation of the barrack rooms was insisted upon in all weathers.

The water supply was intermittent, and came from a catchment area at Senchal, being conveyed by pipes.

### SYMPTOMS.

These, it was found, divided themselves into two classes : (1) Leg symptoms ; (2) heart symptoms.

*Leg Symptoms.* (a) *Anæsthesia.*—In seven cases there was anæsthesia over the front of the tibia on both legs, the area corresponding to the lower two-thirds of the surface supplied by the fourth lumbar nerve ; in these cases a pin could, without causing pain, be pushed into the skin sufficiently hard to cause bleeding. From this area, also, hairs could be pulled out in bunches without discomfort. Thermal sensations were delayed, but not lost. In all these cases the skin appeared pale over the whole leg below the knee. In sixteen cases the areas of anæsthesia were patchy and appeared to vary in situation from time to time. In these cases there was delayed tactile and thermal sensation. In eight cases no anæsthesia could be detected at all. Finally, in none of the thirty-one cases was anæsthesia of the skin observed above the level of the knee.

(b) *Knee-jerks.*—In twenty-one cases this reflex was normal and

equal on the two sides; in two cases both knee-jerks were exaggerated; in one case they were present but equally diminished, while in two cases they were unobtainable, and these two cases were those which presented complete anæsthesia. The remaining five cases showed the reflex to be present, but more exaggerated on one side than the other; ankle clonus and Babinski's sign were absent in all cases.

(c) *Œdema*.—This was observed to be extremely variable both in amount and distribution; in some cases there was distinct pitting, in others the œdema was slight and transient. Its variability in distribution was exemplified by the fact that on one day it would be seen just below the knee, on the next just above the ankle. The œdema was undoubtedly increased by exercise, but the œdema of the cases treated in hospital and in bed did not easily disappear. Both legs were œdematous in twenty-seven cases, with one leg more affected than the other, while in four cases there was no œdema at all.

(d) *Muscular Development*.—In no case was there any wasting noted, but, on the contrary, in those cases with much unilateral œdema, the calf muscles resembled those of pseudo-hypertrophic paralysis. The skin over the calf muscles never gave rise to "pitting," but the muscles themselves when grasped appeared firm, and in eleven cases gave rise to pain on being squeezed. One case exhibited enormously enlarged and tender gastrocnemius muscles. Unfortunately, it was not possible to examine the reaction for degeneration.

(e) *Ataxia*.—The majority of cases complained of numbness and stiffness of the legs, with a liability to stumbling over projecting stones, &c. Some said that their legs "gave way" occasionally. Romberg's sign, however, could not be obtained, and co-ordination appeared normal in the thirty-one cases.

(f) *General Condition*.—In every case the body covering was good and localized wasting was not observed.

*Heart Symptoms*.—The more severe heart affections led one to suspect a right-sided dilatation following upon hypertrophy of the heart as a whole. In some cases the countenance was anxious, in some cyanosis was present, in others there was throbbing in the neck and every heart-beat seemed to shake the body, while in the more severe cases all the above symptoms could be seen. On inspection of the chest one noticed a diffused cardiac impulse and distinct epigastric pulsation. On palpation there was a rapid and irregular impulse, while on auscultation, the heart sounds were heard



to be irregular, the first sound being short, flapping in character and hard to distinguish from the second, unless the apex was palpated simultaneously. There was in many cases a murmur, systolic in time, heard best at the base and not conducted upwards or outwards towards the axilla. On percussion, the heart was found to be enlarged both to the left and to the right, and the impulse much lower than normal. All grades from the severe to almost normal type were observed in the series. Eighteen cases showed right-sided enlargement associated with hypertrophy of the left ventricle in five; in thirteen cases there was only slight enlargement to the right. In eighteen cases epigastric pulsation was distinct, while in twenty-seven cases the pulmonary second sound was reduplicated, this being one of the most frequent signs noted, and it appeared quite early in the disease. In one of the most severe cases, the heart's impulse failed to reach the radial pulse. Lastly, it was observed that the signs of a disordered action were primarily an increase in the number of beats, soon followed by irregularity of action.

I should like to mention that it did not necessarily follow that, because a man showed much œdema, the heart symptoms would be severe, for in some of the cases with large irregular hearts the œdema, anæsthesia and interference with reflexes of the legs were comparatively slight. It would seem therefore that the cause of this peripheral neuritis exhibited a selective action. Precordial pain was another feature in many of the cases, and shortness of breath upon the slightest exertion was a symptom frequently complained of.

*The Blood.*—Examination of the blood-films of those in hospital showed a slight leucocytosis, with a relative slight increase in the mononuclear variety. Blood taken from a vein and planted into ox-bile medium was found to be sterile in every case.

The disease, as far as one observed from the eight cases in hospital, was perfectly afebrile and at no time did the symptoms suggest an acute infection.

In one of the cases, herpes appeared upon the right flank, in the region of skin supplied by the tenth thoracic nerve; there was no anæsthesia noticed, however, except in the legs, but in this case the heart symptoms were severe.

#### THE QUESTION OF INFECTIVITY.

When the battalion returned from Calcutta in the spring of 1912 the companies were distributed differently. "A" Company,

for instance, in 1911 occupied the lines which were allotted to "G" Company in 1912; this makes explanation difficult, and so, for the sake of clearness, the 1912 disposition is considered as the fixed one.

The following table will perhaps help to bring out the points with more clearness:—

Company lines, 1912	Number of cases attending, 1912	Fresh cases, 1912	Lines occupied by 1911 cases	Number of cases, 1911
"A" .. ..	11 ..	6 ..	"G" .. i.e., 5 cases in "A" Company arose while this Company was occupying the present "G" lines	5
"B" .. ..	0 ..	0 ..	—	—
"C" .. ..	2 ..	1 ..	"B" ..	1
"D" .. ..	2 ..	2 ..	"F" ..	0
"E" .. ..	2 ..	1 ..	"D" ..	1
"F" .. ..	5 ..	1 ..	{ "D" .. "C" ..	2) 2)
"G" .. ..	6 ..	3 ..	"A" ..	3
"H" (Barrackpore)—				
Qr.-Mr. Stores ..	1 ..	0 ..	Qr.-Mr. Stores ..	1
Drums .. ..	1 ..	0 ..	Drums .. ..	1
Cases untraced ..	1 ..	1 ..	— .. ..	0
Total .. ..	31 ..	15 ..	— .. ..	16

<sup>1</sup> Two men were transferred from one Company to another.

From the table it appears that "A" and "G" Company lines were the ones principally concerned in the outbreak of disease in 1911, and as in 1912 most of the fresh cases arose in these two lines, it seems possible that the disease spread either by contact or because of the presence of neuritis houses. The conditions prevailing at these sites appear to foster the disease, as in "F" Company lines; although there were four cases from other bungalows, only one fresh case arose in 1912. "F" Company lines, it may be argued, did not prove favourable to the spread of the disease owing to their situation. "B" Company lines, although they gave rise to one case in 1911, gave rise to no cases in 1912, while the other lines, "C," "D," "E" Companies, seem to be intermediate not only in fostering the disease, but also in being factors in the origin of the disease. In 1912 "B" Company lines had no cases, for the one case in 1911 had been removed. No fresh cases resulted. Compare this with the other lines, and it is seen that wherever old cases lived, new cases arose, which suggests a possibility of direct infection from case to case.

I was informed by some of the patients who had been in hospital in Calcutta, that other patients in hospital at the same time had contracted the disease from the neuritis cases. Again, I heard that some men of a company of the regiment from England (the 2nd King's Own) stationed at Barrackpore had contracted neuritis from two cases in the 3rd Middlesex Regiment who were left behind after that battalion had proceeded to Cawnpore.

During these months there was one case, not included in this series, which was admitted to hospital for disordered action of the heart. He had suffered on and off with precordial pain, palpitations and shortness of breath. On admission, it was found that he had a previous admission for multiple peripheral neuritis in 1911. On examination, there was throbbing in the neck, a facial expression denoting distress, very distinct epigastric pulsation and a diffuse cardiac impulse. The heart's impulse was well below and outside the normal limit, and was very rapid and irregular. The anterior cardiac dulness was greatly increased and extended to about three-quarters of an inch beyond the right sternal margin. Some of the beats did not reach the radial pulse, and on auscultation the heart sounds followed one another in rapid succession; the first was weak and flapping in character; there was a short bruit which was not conducted and which was systolic in time. The lungs were carefully examined, but they appeared to be healthy. The liver and spleen were not enlarged, and there was no free fluid in the body cavity. There was no œdema of the legs, the knee-jerks were normal and there was no anæsthesia. The urine was normal and no casts were found. He was kept in bed and given a mixture of digitalis and strychnine, together with hot fomentations to the chest. For a few days he seemed to improve, but one morning he complained of great pain over the ensiform cartilage; great difficulty in breathing was evident by the obvious action of the accessory respiratory muscles and by cyanosis. At intervals he coughed up a good deal of frothy blood-stained and watery-looking fluid. Examination of the chest showed bilateral dulness at the base, with diminished breath sounds which gave one the impression of acute œdema of the lung and some exudation of fluid into the pleural cavities. He was given an injection of digitalin. He seemed to be easier, but there was still great cyanosis which necessitated venesection; nearly eighteen ounces were withdrawn from the right median basilic vein. Injections were continued and a free saline purge was administered, but he grew rapidly worse; the pain and distress increased until he succumbed. At the post-mortem exam-

ination free fluid, pale green in colour and quite clear, was found in the pleural cavities; there were no recent adhesions, but some old ones at the right apex. The lungs were very dark and firm; on squeezing, a large quantity of frothy fluid exuded but there was no consolidation. There was an unusual amount of free fluid in the pericardial sac, the heart was seen to be enlarged, especially to the right. The left ventricle showed signs of hypertrophy. The right ventricle was filled with blood, the wall was thin and exceedingly soft, so that the fingers could be pushed through the muscular substance with ease. The same condition was also observed in the muscle of the left ventricle. The liver was not enlarged; the spleen was of normal size and did not appear to be congested, although it was soft in consistence. There was no free peritoneal fluid. The legs were not œdematous.

This case presented features which are analogous, if not identical, with those of sudden death from beri-beri due to rapid hydrothorax and pulmonary œdema.

The man, in my opinion, suffered from disordered action of the heart as a result of his previous attack of neuritis in 1911, which had permanently deranged the cardiac nerve endings, presumably those of the vagus. If this be the case, then this form of multiple neuritis is very closely related to beri-beri, and the difference is mainly one of degree.

#### TREATMENT.

The treatment of these cases in Lebong, it must be confessed, was unsatisfactory, and was, of necessity, symptomatic in character. It has already been observed that the cases which arose in 1911 recovered from their disability when they went to Calcutta for the winter, and very little drug treatment appeared necessary. Again, when the regiment left Lebong for Cawnpore, the majority of men shook off their disease, and upon inquiry from the medical officers at that station a year later (1913), it was reported that physical signs persisted in only two of them; the sign remaining being tachycardia. This evidence seems to show that removal of the affected individual from an area where peripheral neuritis is prevalent is the best method of treatment.

For those patients with rapid and irregular heart's action, I found that a mixture of digitalis, liquor strychninæ and atropine, along with a belladonna plaster locally, was successful in combating the symptoms. The worst cases were admitted to hospital, and were kept at rest.

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The cases presenting œdema and anæsthesia of the legs seemed to be relieved by local applications of glycerine of belladonna, Scott's dressing, or hot fomentations followed by massage and the electric battery. Even with rest and local applications the œdema and anæsthesia were aggravatingly persistent. Such drugs as quinine, iron and arsenic, had not the slightest effect. Although there was nothing to indicate a metallic poisoning and subsequent neuritis (e.g., blue line on the gums) the sulphate and iodide treatments were adopted, but no improvement was noted in the cases undergoing this regime.

### GENERAL REMARKS.

We have before us a definite disease which is prone to affect the soldiers in a garrison, while officers, non-commissioned officers, women and children appear to be peculiarly free from the disease.

Putting aside for a moment the question of infectivity by contact, it was thought possible that cases might have arisen from some source common to soldiers, and one which would not affect officers, non-commissioned officers, women or children. Some form of metallic poisoning might account for the neuritis, and so these possibilities were investigated.

The coffee shop tea supply was considered first. The tea was made by boiling municipal water (from Senchal) in large metal chatties, and either fresh separated milk or more frequently condensed tinned milk was added. The tea was served either direct from the chatties in the supper room, or was conveyed round barracks in tin cans, served out to soldiers by means of a tin ladle. Officers, non-commissioned officers, women and children never made use of this supply. The large chatties were never re-tinned, and the possibility of the entrance of metallic elements was not lost sight of. The tinned milk looked quite good. But as there were no means of examining the water or the condensed milk or the final tea after boiling in the chatties, for the presence of tin, lead or antimony, &c., quantitatively or qualitatively, nothing can be said for or against the theory.

The mineral waters were made in the soda-water factory using water from the municipal supply, and were consumed by officers, non-commissioned officers, women and children, and it is therefore improbable that these beverages were to blame. It might be said that the cases were "cardiac" cases, i.e., the result of heart-strain with dilatation. If so, it at once becomes difficult to account for the

anæsthesia, the loss of knee-jerks in some cases and exaggeration in others, the variable œdema in the legs and œdema with very slight affection of the heart. At the same time it must be confessed that the condition became aggravated by exercise, and this was well exemplified by the fact that the greatest number of cases came to light during field training and during the time when running parades were in force. I believe that the disease was present and that exertion aggravated it to such an extent as to call the men's attention to its existence.

It has been observed that most cases arose during field training or very soon afterwards. In the rainy season grass and weeds grow luxuriantly, and it is impossible to walk a short distance through this without finding a large number and a great variety of leeches upon one's boots and putties. It was therefore thought that the poison of multiple peripheral neuritis was injected by means of the leech bites, because upon inquiry almost every man suffering from the disease had been bitten. Experiments were tried by Major Bennett, R.A.M.C., to produce the disease in a goat by means of an extract from a collection of leeches and also by direct application of live leeches. No signs of the disease in the goat resulted. It was observed that the skin round a recent leech bite was anæsthetic in one of the soldiers affected by the disease.

Finally, if peripheral multiple neuritis is an infectious disease, as there are some grounds to believe it is, we ought to find evidence of it elsewhere. It is, I think, certain that a disease of a similar nature is prevalent amongst tea-garden coolies in the immediate vicinity of cantonments. This disease tends to run through families and many families are affected. Some die, and from all accounts the mode of death is the same as in the fatal case reported above. The cases show rapid heart's action, œdema over the tibiæ, affection of the knee-jerks, a systolic bruit (not conducted) and accentuated pulmonary second sound. Pyorrhœa, and in one case a blue line, was present; in another case there was ascites without œdema of the legs.

In cantonments there was a native porter who showed a great amount of œdema over the tibiæ, with well marked anæsthesia, but he was able to carry heavy loads up the hill-sides with apparently very little cardiac distress.

Furthermore, one dog was brought to me because of shortness of breath, the heart's action and sounds were comparable to those in affected human beings; this dog began to bring up a frothy

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fluid from the chest and died. Previous to death both lungs were dull on percussion. Another dog was seen with a swollen abdomen due to ascites. At the autopsy the peritoneal cavity was full of a pale yellow fluid and no inflammatory lesion could be found in the abdominal organs. The chest also was full of fluid. The heart sounds before death appeared normal. The liver was not enlarged, nor was the spleen.

If the symptoms quoted amongst natives are those of multiple peripheral neuritis, then it can be fairly said that the disease is endemic in Lebong. Moreover, since cases have arisen in Barrackpore and in Calcutta it is quite likely that the disease is endemic in Bengal. The fact that, as far as one knows, no fresh cases have arisen in Cawnpore, and the men who went to Cawnpore have quite recovered, seems to accentuate the difference between Bengal and the United Provinces. Civilian practitioners know of this disease amongst coolies in the large Darjeeling district, and it is termed "beri-beri" by them. But, if the disease in Europeans and Natives is identical it becomes hard to realize by what means the poison is conveyed from one to the other, and it was hoped that the leeches would prove to be the intermediaries.

It will be interesting to observe if the men of the 2nd King's Own Regiment become attacked by the disease during their service in Lebong. The battalion is made up of men from the 1st Battalion recently at Lucknow, and of those who have come direct from England. Had not the circumstances of the Service necessitated one company of the regiment going to Barrackpore, where some of the Middlesex cases of multiple peripheral neuritis remained, the regiment would have commenced its service in Lebong with an absolutely clean sheet.

I am informed that about half a dozen cases made their appearance in this company at Barrackpore, and as this company has since arrived in Lebong there is some possibility of an importation of the disease from that source. Had the regiment as a whole come to Lebong, and had any cases arisen subsequently, it would have gone a long way to prove that the disease of multiple peripheral neuritis is endemic in Lebong and that it can be contracted without the presence of existing cases amongst Europeans residing within cantonment limits.

At any rate the disease is a very important one because it causes the complete disability of the soldier for a long period.

The soldier so affected cannot march, cannot perform his physical exercises, and his shooting is interfered with, partly

because he is unable to march to the range, and secondly, the rapid and forcible heart's action, when he does reach the range, makes his aim inaccurate.

At the end of the summer season some twenty men were quite unable to march down to Siliguri with the battalion and they were compelled to go by rail because of their disability.

In conclusion I would like to express my thanks to Major G. M. Goldsmith, R.A.M.C., and to Major Bennett, R.A.M.C., for their kind assistance and many suggestions.



## United Services Medical Society.

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### THE LIFE AND WORK OF JEAN DOMINIQUE, FIRST BARON LARREY.

BY SURGEON-GENERAL SIR LAUNCELOTTE GUBBINS, K.C.B., M.V.O., K.H.S.,  
*Director-General, Army Medical Service.*

JEAN DOMINIQUE, first Baron Larrey, was born in 1766, or three years before his great master, in the village of Baudéan at the foot of the Pyrenees; in fact, not far from Bagnère-de-Bigorre, so well known to modern tourists. Being left an orphan at an early age he moved to Toulouse, where, under the fostering care of his uncle, Alexis Larrey, a professor at one of the largest civil hospitals in that town, he studied medicine for six years. He then moved to Paris, and at the age of 21 joined the Navy for a short time, but after a six months' voyage in the frigate "Vigilante," during which he was nearly shipwrecked, he took a dislike to that service and again found himself in Paris in 1789, the year of the outbreak of the French Revolution, which, setting aside the sanguinary excesses by which it was marked, is justly regarded as the era of liberation of mankind. Larrey became a child of the Revolution, joining the students in the assault on the Bastille and subsequently bestowing his professional skill on its victims, who came under his care at the Hôtel Dieu, where he was under the immediate supervision of the great surgeons Desault and de Louis.

It was not until 1792 that he embarked on his military career. On April 1, 1792, he joined the headquarters of the Army of the Rhine at Strassburg. He was appointed Medical Chief of Custine's Division, and it was during the operations round Mayence and Frankfort that he realized from actual experience the very unsatisfactory methods that then prevailed for dealing with casualties on the battlefield. Under the existing regulations the ambulances were obliged to halt a league from the fighting line, whilst the wounded had to remain on the battlefield until after the combat. Their condition was bad enough in the case of victory, hours elapsing before they could be dealt with, but in the event of defeat they were usually abandoned to their fate.

Larrey was so depressed with what he saw that he conceived an idea for giving them immediate succour. This was the invention

of a rapidly moving field ambulance (*ambulance volante* as it was called), which could keep pace with the fastest battery of artillery.

The ambulances were organized in divisions, each division consisting of a personnel of 140 of all ranks, including the transport section. The conveyances were twelve spring vehicles for the transport of severely wounded men and four store wagons; these were brought close up to the firing line and, as the Baron himself recorded, their appearance alone created confidence amongst the soldiers, who now felt they would receive prompt succour on the battlefield. During one of the engagements at this time he was wounded in the leg, and when the army went into winter quarters he was dispatched to Paris, in order to superintend the organization of the *ambulances volantes* for all the armies in the Republic.

During his stay in the capital he married, in 1794, Madame Leroux de Laville, a daughter of a former Finance Minister, and soon afterwards he was appointed Surgeon-in-Chief of the Army of the South destined for Corsica, and immediately set out for Toulon. He was then only 26 years of age. His next war service was for a short period in the eastern part of Spain, and on the conclusion of peace he returned to Paris. Whilst in residence there he opened a school for the teaching of anatomy, physiology and practical surgery, which became immensely popular with the medical officers of both the Army and Navy. His fame as a lecturer having reached the Government (at that time the Committee of Public Safety), he was, on a vacancy occurring, appointed Professor of Surgery and Anatomy in the Military School of Medicine that had recently been established at the Val de Grâce.

The even tenor of his existence was, however, soon to be broken, for in May, 1797, he was suddenly ordered to join the Army of Italy under General Bonaparte, with whom for the first time he was brought into official contact. The work of the campaign was practically over, but Bonaparte, as the result of the experience gained therein, decided that the ambulance transport required reorganization and that Larrey was the man to do it. He arrived at Montebello, where the General had his headquarters, and after a long discussion and searching cross examination was given a free hand; he then set to work with a will, and in a comparatively short time organized three divisions of *ambulances volantes*, which were subsequently inspected by the General-in-Chief, who warmly congratulated him on the result of his labours.

It was at this period that Larrey made the acquaintance of those brilliant young officers, many of whom subsequently became

Marshals of the Empire. His particular friend amongst them was General Desaix, the dashing soldier who afterwards fell at Marengo.

At the conclusion of his work in Northern Italy he returned to Paris in December, 1797, and resumed his work at the Val de Grâce.

We now come to what was probably the most romantic enterprise undertaken by any European Power in modern times ; I allude to the French expedition to Egypt in 1798, in which Larrey played a conspicuous part as Surgeon-in-Chief. He was throughout ably assisted by Desgenette, an officer of conspicuous ability. One of the most remarkable features connected with this expedition was the number of literary and scientific men who took part in it, many of whom belonged to the Institute of France. The highest names in astronomy, mathematics, and mineralogy were to be found, nor were the greatest living authorities in France on literature, painting, architecture and interpreters in Oriental languages lost sight of ; in this respect it was indeed unique. The force employed was about 33,000 of all ranks. Leaving Toulon on May 19, and capturing Malta *en route*, the expedition reached Alexandria on July 1, where the troops immediately landed, and after a sharp action occupied the place. Larrey's ambulances were organized in three divisions and were soon at work.

Larrey's chief difficulties were in combating ophthalmia and plague, which dogged the steps of the French Army throughout their stay in the country, as also those of the English force under Sir David Baird that appeared on the scene at a later period.

Before long Larrey was called on to accompany Bonaparte in his invasion of Syria, and in connexion with this he organized camel transport for conveyance of the sick. Failing to take St. Jean d'Acre, stoutly defended by the Turks under Sir Sidney Smith, Bonaparte retraced his steps to Egypt, the army suffering terribly *en route*. In addition to the diseases already mentioned, scurvy made its appearance ; there were also numerous cases of leprosy and elephantiasis. Moreover, the superior officers on reaching Cairo developed nostalgia in an alarming degree, so much so that a Board, consisting of Larrey, Desgenette, and another senior officer, was formed at headquarters to deal with these gentlemen. Every artifice was tried by them : bribery, in the shape of money, precious stones, and Arabian horses, was attempted, but was of no avail ; the Board was as hard as adamant.

I need not weary you with a further description of Egypt, a

country so well known to many here present. Suffice to say that the expedition ended disastrously for the French; the fleet was destroyed by Nelson in his famous battle, and the army, or what was left of it, surrendered to General Hutchinson in March, 1801. It was during the final battle of Aboukir (Canope) that Larrey performed a heroic act. General Silly's left knee was shattered by a cannon ball. Larrey amputated the limb on the spot; and just as he had finished the operation the English cavalry was seen approaching. Larrey placed General Silly on his back and carried him to a place of safety, and it is pleasing to record that General Silly eventually made a good recovery. Bonaparte in the interim had quitted Egypt surreptitiously; he offered to take Larrey with him, but to his honour be it recorded he declined to desert the sick and wounded at a time when his services were most needed. In the capitulation it was stipulated that the French army should be transported to France, and Larrey on arrival at Marseilles found he had been appointed Surgeon-in-Chief to the Consular Guard, with charge of the hospital of that corps.

On arrival in Paris he was received with enthusiasm, the fame of his splendid services in Egypt having preceded him. For the next few years he enjoyed a domestic life, and during this period he was appointed "Inspecteur-général du Service de Santé," and also received the insignia of the Legion of Honour.

In 1805 he was ordered to Boulogne, to superintend the medical arrangements of the Expeditionary Force for the invasion of England. To this day no one can tell for certain whether this invasion was ever really meant. Owing to a new combination against France the Boulogne army started for Germany on August 29, and two months later the decisive victory at Trafalgar settled the question of invasion for many a year to come.

In the autumn of 1805 Larrey proceeded as Surgeon-in-Chief to the Army on that memorable campaign in Austria which culminated in the battle of Austerlitz, in Moravia, in December of that year. In dealing with the large number of wounded in this great contest he was ably assisted by Baron Percy, who was subsequently one of the most distinguished surgeons of the Empire. Large base hospitals were established at Brünn, and no difference was made between friend and foe. Hardly had peace been concluded when the dreaded typhus broke out, and in less than a month a quarter of the immense number of wounded of the three armies that were congregated in the town died of this disease.

Larrey had, however, one great defect in character, and that

was his extreme timidity in pushing the claims of himself and of the officers serving under him. At the conclusion of this campaign money and honours were showered upon the generals and other inferior officers, but the medical officers were neglected, and it was rather humiliating to read that in order to obtain an indemnification for his losses incurred in the field, the aid of Madame Larrey had to be invoked, when this lady, by a personal interview with the Emperor, secured a settlement of his claims.

He returned to Paris in 1806, but in a few months he was again on the move—this time against Prussia. The Prussian army was then an unknown factor; it was living on the reputation gained under the great Frederick, nevertheless it suffered a double defeat on the same day (October 15), at Jena and Auerstädt; fortresses and prisoners surrendered in the most wholesale and pusillanimous manner, and the Prussian monarchy tottered like a house of cards.

The losses of the French were comparatively light in this campaign in view of the enormous results secured, and Larrey having but little to do pushed on to Berlin, which he entered with the Emperor at the end of October and there made the acquaintance of Alexander von Humboldt; Goerke, the surgeon; Loder, the anatomist, and other distinguished men.

Now as to the causes of the disasters which this war of 1806 brought on Prussia. The first was that the army was living on a past reputation, and not keeping pace with the times. The great Frederick, in his two chief wars, out of fourteen pitched battles had won eleven—almost invariably against superior numbers. In the space of ten months (between November, 1757, and August, 1758) he had, as you know, defeated the French at Rossbach, on his western frontier, then rushed off south, where—to use a modern phrase—he polished off the Austrians at Leuthen, and finally at a later date, turning east, inflicted a crushing defeat on the Russians at Zorndorf; all this tended to maintain the Prussians in their belief that they and their methods were invincible.

The second was the advanced age of the generals—the vast majority of them being physically and mentally incompetent—a condition from which we ourselves suffered in a lesser degree in India at the outbreak of the Mutiny; and when you hear people talk of the hardship of placing Generals Brown and Robinson on the retired list, who, although they have reached an advanced age, and apparently (I use the word “apparently” advisedly), have still a lot of go in them—remember the disasters to Prussia in 1806,

and to the British *raj* in 1857. However, there are always exceptions to the rule, and the exception in this instance was Blücher, the veteran of Frederick's wars, who, for the next nine years, was *the* fighting man of the Prussian army.

But these easy times in Berlin did not last long, and soon the French Emperor was called on to meet a foe of a very different calibre. The Russians were on the move, and both armies approached the line of the Vistula; after two minor battles, in which the French came off second best, they retired to Warsaw, where Larrey set about perfecting his arrangements for the coming campaign.

Warsaw was a delightful place, with fascinating female society, and the French hoped they might spend the winter there in comparative peace; but the Russians were again on the warpath, and the French army marched through the most frightful country to meet them. Then ensued the terrible and sanguinary battle of Eylau, fought on February 8, 1807; the casualties on both sides were nearly 50,000, the weather was dreadful, the lakes frozen, snow fell almost without intermission, and so intensely cold was it that the instruments necessary for operations dropped from the powerless hands of the surgeons. Larrey's exertions were prodigious. At one time he was almost surrounded by the enemy, but was saved by an opportune charge of the cavalry of the Imperial Guard.

For ten days after the battle the French army remained on the scene, and the Emperor was incessant in his visits to the wounded; so much impressed was he with Larrey's splendid work that he not only presented him with a sword of honour, but advanced him a step in the Legion of Honour.

As regards the last months of this memorable war, suffice it to say that the decisive victory of Friedland gained by the French Emperor in the balmy month of June, followed by the peace of Tilsit, brought hostilities to a conclusion, when Larrey with increased prestige returned to Paris.

Larrey's next employment was in Spain, where he joined the staff of Murat, the great cavalry soldier—inspecting the hospitals *en route*, which were far from satisfactory. He at length found himself in Madrid, where an insurrection ere long broke out; the infuriated populace attacked the military hospital, but Larrey, who happened to be in the building at the time, armed his staff and the convalescents and beat off the crowd, which fully intended to murder all Frenchmen who fell into their hands.

The insurrection, however, spread throughout the country. An English force, under Sir J. Moore, got as far as Valladolid. The Emperor himself appeared on the scene, and having pursued the English as far as Astorga, he handed over the command to Soult and returned to Paris. After the retreat and battle of Corunna many wounded English prisoners fell into the hands of the French, and towards these Larrey exhibited the greatest humanity; he was astonished to find the very considerable number of women and children which in those days accompanied our troops, and these poor creatures he provided with food and shelter.

About this time he was attacked with what appears to have been typhus fever, and for some time his life was despaired of; in fact, his death was reported in Paris, and this had the worst effect on the health of Madame Larrey, who had recently given birth to a son. However, he eventually recovered sufficiently to be able to travel, and leaving Valladolid early in March reached Paris on April 5, 1809—weary, though convalescent. Naturally, he now expected some repose, but the time was not yet.

He had been barely three weeks at home when he was summoned to join the Emperor in his new campaign against Austria, and he joined the army at Augsburg, where he was greeted with acclamation, all ranks turning out to welcome him. Reaching Vienna on May 12, the Emperor told him to make his preparations for hard fighting, and at Essling, a few miles from the capital, took place the sanguinary battle of that name which was a French defeat, and in which the celebrated Marshal Lannes lost his life. The wounded suffered terribly, owing to the destruction of the bridges; food or medical comforts were almost impossible to obtain, and tetanus claimed many victims.

Having transferred all wounded fit to travel to Vienna and Ebersdorff, Larrey made his preparations for the next battle, which proved to be the decisive victory of Wagram, on July 6. The large number of wounded, including many distinguished generals, were dealt with so expeditiously and humanely by Larrey and his subordinates that the Emperor, to mark his approval, bestowed on him a pension of 5,000 francs, a miserable sum compared with the grants to other officers. On the conclusion of peace Larrey remained behind until all the sick and wounded had been satisfactorily disposed of. Reaching Paris on November 18, he rendered a report to the Chief of the Staff and was able to point out that although wounds from artillery were out of all proportion at the two sanguinary battles of Essling and

Wagram, the mortality was only 11 per cent, which was extraordinarily low for that period.

The years 1810-11 were for Larrey a period of repose, but in February, 1812, he left Paris to make his preparations for the expedition to Russia, of which he was nominated Surgeon-in-Chief. Making Berlin his headquarters he was assisted by his old comrade, Desgenette, and took the opportunity of delivering a series of surgical lectures, which were attended by all the medical officers of both the French and Prussian armies who happened to be in Berlin at the time. Into the various incidents of that terrible war time does not permit me to enter; of the 400,000 men who crossed the frontier in June, barely 30,000 recrossed in December. Larrey was in the thick of everything, and at the passage of the Beresina he was saved from certain death by the devotion of some soldiers of the Imperial Guard. He has left on record the curious fact that the natives of southern France and Italy stood the intense cold far better than their comrades of northern climes.

Larrey's first sojourn of any importance, after crossing the frontier, was at Königsberg, where he sorted out the wounded and redistributed the duties amongst the surviving medical officers of the Grand Army; this place was, however, soon evacuated, and on February 10, 1813, he reached Frankfort-on-the-Oder. During all this time he never ceased to make inquiries as to the fate of the medical officers who had disappeared during the disastrous retreat from Moscow, and through the personal intervention of the Emperor Alexander he secured the release of Desgenette, who had been captured by the Cossacks.

At the opening of the Russian campaign the officers of the "Service de Santé" amounted to 826; of these, on February 15, 1813, there were present only 275, showing a net loss of 551 through death from battle, disease, cold or taken prisoners; this was embodied in a report to the Minister of War. A Surgeon-Major Capron, who had been captured by the Cossacks and interned at Wilna, reported that nearly 50,000 prisoners of the French army had there died of wounds, cold and hunger; he subsequently escaped and joined Larrey at Frankfort.

We now come to the memorable campaign of 1813, that momentous year which saw the resurrection and liberation of Germany. For this many eminent men, in spite of the feeblest of monarchs, were responsible, amongst them Stein, Scharnhorst, Gneisenau, Yorck, and the redoubtable Blücher; nor must we omit Körner, the modern Tyrtæus, whose lyrics did much to stimulate



the German youth, and who himself fell in one of the later battles. Since those days nothing has been omitted that can stimulate the patriotism of the rising generation. As you are all aware, 1913 has been a year of centenary celebrations of great events, culminating last October in the ceremonies at Leipsic on the anniversary of that great battle—the battle of the nations as it is generally styled, and which occupied three days, October 16-18; in this battle the British army was represented by the Rocket Troop, R.H.A., commanded by Captain Bogue, who was killed on the last day.

However, to hark back to the month of May, Larrey joined Napoleon's headquarters and soon had his hands full. The victories of Lützen and Bautzen followed in quick succession; the losses were heavy, especially amongst the senior officers. The young French soldiers, being immature conscripts, soon filled the hospitals; nevertheless, it may be said that wherever the Emperor (who was considered the equivalent of 40,000 men) commanded in person, he was, with the exception of Leipzig, victorious, but his marshals were invariably beaten.

His last battle on German soil, and at which Larrey was present, was at Hanau, against Wrede, the Bavarian commander, whose faulty dispositions soon left him at the Emperor's mercy, who (remarking that although he had created him a marshal he could not make him a general) inflicted on him a crushing defeat, and resumed his march towards the French frontier.

Larrey remained behind to organize the hospitals, notably at Mayence and Metz, for the large number of wounded and sick, typhus being specially prevalent amongst the latter, and at last, after an absence of nearly two years, he was able to pay a flying visit to his home in Paris, in January, 1814.

The final act in the drama was the campaign in France in the early months of 1814. Larrey had but a few weeks with his family when he was ordered to join headquarters at Brienne, which he reached on January 30, resuming his old rôle as Surgeon-in-Chief of the Army. An action immediately took place near that town, in which Blücher was defeated; other battles followed, in most of which Larrey participated. In several of these the victory rested with the French, but the numbers against them were overwhelming, and the entry of the Allies into Paris practically finished the war. Larrey was present when the Emperor signed his abdication at Fontainebleau on April 17. He offered to accompany him to Elba, and the Emperor, deserted by practically all his marshals, was

deeply touched : he embraced him affectionately, recounting his long and distinguished services, but told him his post was with the army, and finally bade him adieu. They were to meet again sooner than they imagined.

On the deposition of the Emperor, Larrey, much broken in health, proceeded to Paris, where he was a member of the Medical Board at army headquarters; but service under the Bourbons was distasteful and, on the sudden return of Napoleon in March, 1815, he resumed his old rôle of Surgeon-in-Chief to the Army. During the hundred days he worked at high pressure preparing his service for the coming campaign. On June 7 he joined the army in the field and on the 15th, with the Emperor, crossed the frontier and was present at the sanguinary battles of Ligny and Waterloo.

Larrey related an instance of courage and devotion on the part of a Colonel Lourd, of the French Lancers, who was badly mauled by the English Lancers at Genappe on the 17th, during the retreat. He was brought to Larrey, who there and then amputated his right arm near the shoulder. At the conclusion of the operation the colonel dictated a letter to the Emperor, begging not to be removed from the command of his beloved Lancers, and on no account to be made a general; having signed the letter with his left hand he was assisted to mount his horse and galloped off to rejoin his regiment. Such was the spirit of the gallant French army during that brief campaign.

During the great battle of the 18th, Larrey established his ambulances at Caillou, and subsequently at the farm of La Belle Alliance, places which any of you who may have visited the battlefield will readily remember. He had been operating without intermission from midday until 8 o'clock in the evening, when on the *débâcle* taking place, the Emperor directed him to withdraw his ambulances and make for the frontier. Larrey started off with some of his surgeons, when they were overtaken by some Prussian cavalry; he discharged his pistols at them and they plied their carbines, with the result that Larrey's horse was wounded: it fell, bringing down the rider, and whilst on the ground he received two sabre cuts which rendered him insensible, when the Prussians believing him to be dead left him. On regaining his senses he endeavoured to reach French soil on foot, but was then taken prisoner by the Prussians, who robbed him of his arms, watch, ring and most of his clothes, finally bringing him before a senior officer, who sentenced him to be shot. From this fate he was saved by a Prussian surgeon-major, who recognized him as the lecturer on

surgery in Berlin, in 1812; eventually he was released by Blücher, whose son he had befriended in former days, and sent to Brussels.

Larrey was obliged to leave Brussels and return to Paris, where he was deprived of his rank and pension by the Bourbons; the Emperor Alexander, however, who held him in the highest esteem, offered him an exalted position in the Russian army, but he refused this and similar offers from other foreign princes. In 1818, however, his pension was restored, and he was at the same time nominated Surgeon of the Royal Guard. During this period he was occupied in writing his memoirs, and from 1821 up to his death he made numerous contributions both to medicine and surgery.

In 1826, in order to study the hospital system in Great Britain, he made a journey to London, where he was received with open arms by the most distinguished medical men of the day, including Astley Cooper, Carmichael, Everard Home, Lawrence, and Guthrie. Other men of note with whom he came in contact were Sir Sidney Smith, Admiral Malcolm, Lord Holland, and Sir Walter Scott, who had recently completed his "Life of Napoleon." He was especially interested in Chelsea and Greenwich Hospitals, which in those days were full of veterans of the great war, and concluded his trip by visiting the more important centres in the kingdom.

The revolution of July, 1830, was welcomed by Larrey, and during the three days' fighting he was again called on to defend his hospital (Le Gros Caillou), where the wounded of the Royal Guard were being treated, against a bloodthirsty mob. Soon after he was appointed Surgeon-in-Chief of the Hôtel des Invalides, where he felt quite at home amongst the veterans of the Empire.

In 1834 he was permitted to visit Italy, and when at Rome he paid his respects to *Madame Mère*, the mother of the Emperor, then in her 88th year. He was accompanied by his son, Hippolyte, whom the old lady, who was quite blind, insisted on embracing. He was a gifted young man, who was appointed in 1841 Professor of Surgical Pathology at the Val de Grâce, and eventually rose to the highest position in the medical service of the French army under the Second Empire.

In 1842, Larrey, now a septuagenarian, started to inspect the hospitals in Algiers. On arrival at Toulon on his return journey, being very ill, he was strongly advised to rest there for a time; obstinate, however, like many old gentlemen, he started for Paris, but got no farther than Lyons, and there he died in the presence of his son, the companion of his expedition, on July 24, aged 76,

leaving a name that will ever shed lustre on the army he had served so well. The Emperor, when he had time to reflect, as was the case at St. Helena, did him full justice, as both O'Meara and Las Cases can testify, always mentioning him with respect and affection: this he evinced in a practical manner by leaving him 100,000 francs in his will.

In estimating the work and character of Baron Larrey it is very natural that we should contrast him with his contemporary in the British Army, Sir James McGrigor. Both had much in common: they were born about the same period, McGrigor being the younger man; they were the Medical Directors in the field in their respective armies under the two greatest soldiers of all time. Whilst Napoleon placed on record that Larrey was "the most virtuous man he had ever known," the Duke of Wellington, in his final dispatch on the termination of the Peninsular War, wrote: "I consider Mr. McGrigor one of the most able, industrious, and successful public servants I have ever met with." Such eulogiums, coming from such men, always chary of their praise, were something to be proud of. Both exhibited the same constancy, courage and devotion, whether on the battlefield or facing epidemics; but although Larrey saw a great deal more active service, I cannot help thinking that McGrigor had a higher conception of the rôle of an administrative officer. For instance, the biography of Larrey teems with instances when he spent valuable time during an engagement in performing critical operations which might well have been left to his executive officers. It is also stated that with the help of a young chemist he embalmed at Vienna the body of Marshal Lannes, a proceeding it is difficult to reconcile with his exalted position. McGrigor, as far as we can judge from his autobiography, was an administrator before all things.

Lastly, as regards posthumous honours, there is a certain similarity, for whereas the monument to Baron Larrey occupies the grounds of the Val de Grâce in Paris, the statue of Sir James McGrigor adorns the precincts of the Royal Army Medical College, London. In both instances these enduring memorials were erected as tributes not only of admiration, but of *affection* by officers of all arms in their respective armies.

It is pleasant to note that these two eminent officers met on at least two occasions: the first was in Egypt, in 1801; and the second in Paris, in 1814. I can find no mention of any intercourse during Larrey's visit to this city in 1826, but it is more than probable that he enjoyed McGrigor's hospitality.

When I sat at Burlington House, over forty years ago, for the language test (a voluntary subject) at the Army entrance examination, I can well remember the paper we were given to translate was one in which an eminent French writer (M. Taine) was moralizing on the life of the Duke of Wellington, and he concluded his essay by asserting that the greatest legacy the Duke had bequeathed to his countrymen was "the contemplation of his character."

May I adapt this aphorism to the subject of my sketch, and express the humble opinion that Jean Dominique Larrey has, in the same sense, left a valuable legacy to army medical officers throughout the world, irrespective of nationality?



## Clinical and other Notes.

### RECURRENCE OF INGUINAL HERNIA.<sup>1</sup>

By MAJOR A. J. HULL.

*Royal Army Medical Corps.*

A FEW years ago it was the practice of surgeons when considering the advisability of operating for the radical cure of inguinal hernia, to point out that the operation "only put the clock back" to the condition of affairs which existed previous to the development of the hernia.

This view is no longer generally held. Surgeons who believe in the presence of an abnormal process of peritoneum being the sole cause of hernia, will, if they follow their belief to its logical conclusion, believe that efficient treatment of the sac will invariably cure the hernia. There is no doubt, however, that hernias treated by efficient ligature of the sac and an additional plastic operation upon the inguinal canal do recur. It is probable that the high percentage of failures published in some statistics is due to the fact that many cases treated by obsolete methods of operating were included, and that if a large number of cases could be traced which were operated on by modern methods of performing the radical cure the results would show that the operation is one of the most certainly successful in surgery. I am inclined to this view by the fact that when operating for recurrence of hernia after operation I have rarely found that a typical Bassini operation with displacement of the cord has been performed.

An examination of the methods of recurrence of hernia will guide us to the most satisfactory operation for its radical cure. The type of relapse is found to follow accurately the type of operation originally performed.

(1) If the sac has not been ligatured or sutured sufficiently high up the hernia rapidly recurs in the sac.

(2) Cases operated upon as follows: (a) Opening inguinal canal; (b) ligature of neck of sac; (c) suture of conjoined tendon over cord to Poupart's ligament.

Recurrence takes place often a year or more after the operation. The hernia appears to the inner side of the internal ring and pushes forward the parietal peritoneum and transversalis fascia. A section of the inguinal ring shows the weak spot left by this operation. A tent-like space is formed by the conjoined tendon stretching across the cord. The internal ring is not constricted. Out of fifty-seven cases of recurrent hernia which

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<sup>1</sup> Reprinted from "Annals of Surgery," October, 1913.

have come under my observation, forty-five followed the operation indicated above. Hernia to the outer side of the internal ring or direct hernia does not follow this operation.

(3) Cases operated upon as follows: (a) Opening inguinal canal; (b) ligature of neck of sac; (c) suture of conjoined tendon beneath cord to Poupart's ligament.

The internal ring is efficiently constricted. Recurrence is rare after this operation, and when it does it occurs to the outer side of the internal ring.

The case operated upon by the writer recurred four months after operation. Only seven out of fifty-seven recurrences had been operated upon by this method.

(4) Cases operated upon by ligature of the sac alone.

Relapse usually follows by a protrusion of the parietal peritoneum through the internal ring, which has not been constricted by the operation, or appears to the inner side of the internal ring.

(5) Cases operated upon by ligaturing the neck of the sac and displacing the ligatured neck by buried sutures.

In this method the weakest point of the abdominal wall is transferred from one point to another. Normally the internal ring is the weakest point, and if the neck of the sac be displaced outwards and a typical Bassini operation performed, the weak point becomes the area immediately to the outer side of the internal ring. The procedure of displacing and burying the neck of the sac is probably one of the most valuable steps in the operation for radical cure of hernia, provided the sac is displaced to the safest possible place, which is above the internal ring.

(6) Cases of hernia treated during childhood.

The treatment of hernia in children by trusses frequently effects a temporary cure, a cure which is followed by a relapse sooner or later, when the strain of adult work begins.

From a consideration of the modes of recurrence the following details should be carried out in the operation for hernia: (a) Transposition of the neck of the sac; (b) constriction of the internal ring; (c) strengthening the weak area of the posterior wall of the inguinal canal to the inner side of the internal ring. In the typical Bassini operation this is done by suturing the conjoined tendon to Poupart's ligament; (d) obtaining adequate pressure upon the internal ring; (e) strengthening the weak area to the outer side of the internal ring.

In the following operation, which I now perform and which has been adopted by my colleagues, the above points are embodied. The inguinal canal is opened by dividing the external oblique over the canal from the external ring to well above the internal ring. The coverings of the spermatic cord are lifted with two pairs of forceps and divided between the forceps by a knife the edge of which is lateralized. The sac is recognized and separated from the constituents of the cord. The neck

of the sac is carefully isolated by stripping structures adherent to it by wiping it with dry gauze. The sac is transferred and ligatured as high up as possible, the ligatures are left long and one of the ends is threaded through a needle; the point of the needle protected by a finger is passed through the internal ring and brought out through the entire thickness of the abdominal wall, with the exception of the skin about one and a half inches above the internal ring. The other end is treated in the same way and the ends are tied together.

The next step is to constrict the internal ring and strengthen the posterior wall of the inguinal canal. This is done by separating the two muscles forming the conjoined tendon, and having lifted the cord, suturing the transversalis muscle and conjoined tendon to Poupart's ligament.

The internal oblique is now sutured over the cord to Poupart's ligament, commencing about one and a half inches to the outer side of the internal ring. By this step the area to the outer side of the internal ring, where relapse occasionally occurs, is strengthened, adequate muscular pressure is obtained over the internal ring, and the support of the transversalis, which now forms the posterior wall of the inguinal canal, is reinforced. The spermatic cord now passes between the two muscles which form the conjoined tendon and a recurrence of hernia along the cord is efficiently prevented. It is rarely necessary to lessen the size of the cord by removing some of the veins and coverings. Fishing-gut sutures are employed for these deep stitches, the knot is tied three times and the ends cut short. No after-trouble appears to occur from the use of these hard and unabsorbable sutures. I have used kangaroo tendon in many cases, but consider ordinary fishing-gut a better suture. The inguinal canal is closed by suturing the divided aponeurosis of the external oblique.

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#### A CASE OF TORSION OF THE TESTICLE, TREATED WITHOUT OPERATION.

BY LIEUTENANT C. M. FINNY.

*Royal Army Medical Corps.*

ABOUT 11 p.m. one night I was sent for by Lieutenant L. He stated that while at mess that evening he had suddenly been seized with a violent pain in his left testicle. He went to his tent, where he vomited several times, while the pain continued to increase. He told me that as a boy he had suffered from an undescended testicle on the left side, which, however, had, eventually found its way into the scrotum without surgical intervention. On two previous occasions he had suffered from attacks similar to the present one, but they had ceased spontaneously in a few hours.



On examination the left testicle and cord were found to be much swollen and tender, so that it was impossible to distinguish the epididymis from the rest of the organ. His temperature was sub-normal, pulse 100, and there was no abdominal rigidity.

Thanks to the history there was little difficulty in arriving at a diagnosis of torsion of the testicle, but in view of the spontaneous recovery in the two previous attacks palliative measures were first given a trial. These proved of no avail; the patient continued to vomit repeatedly and the pain was unrelieved. Before finally sending him to hospital—a distance of 7 miles—I decided to try manipulation. Twisting the testicle inwards was found to increase the pain. It was therefore rotated outwards firmly, and after passing through half a circle a sensation similar to that experienced on reducing a dislocation was felt as the organ suddenly resumed its normal position. The pain immediately abated, the patient went to sleep, and the next morning felt quite well. The swelling had disappeared and merely a small effusion into the tunica vaginalis remained, which disappeared in a few days.

Two features about this case seem to me to be of interest. The first is that the torsion occurred while Lieutenant L. was seated at table. The second is that, though the treatment is doubtless not original, I have been unable to find, in the surgical literature on the subject which I have searched, any other course recommended except that of immediate operation. This case is submitted as a plea for giving less radical measures a trial before having recourse to the knife.

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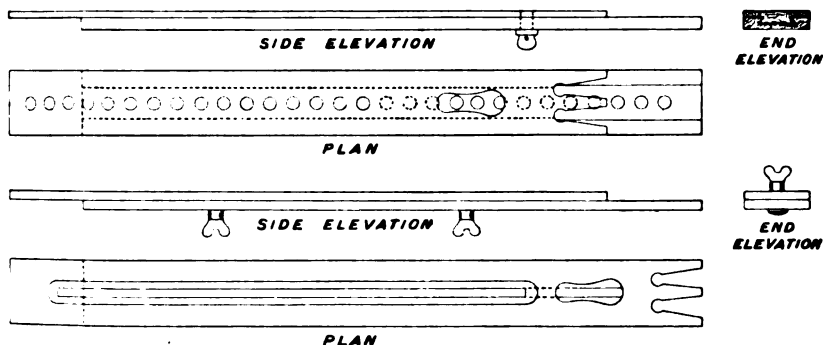
#### A NEW THIGH SPLINT.

BY LIEUTENANT J. E. HEPPER.

*Royal Army Medical Corps.*

THE diagrams illustrate a modification of Liston's thigh splint, which I have designed, and which would, I think, be very useful in the Army, owing to its portability. I have made two patterns, No. 1 and No. 2. Both splints consist of two pieces of wood sliding one on the other (see diagram), but in No. 1 they are fixed by two butterfly screws, and in No. 2 by means of a dovetail and peg. I may add that if this peg is lost its place can be taken by a bandage bound round the splint. By means of this sliding arrangement the splints are adjustable to any sized leg, and when closed fit the panniers. (No. 1 was made too large by mistake.) Each splint comes apart and so makes two short side splints if necessary. I may point out that I only made No. 2. in deference to an objection raised against No. 1, to the effect that the butterfly screws might be lost. Against this objection, however, I would suggest that it

would be a comparatively simple matter to carry spare screws. Of course, when the splints are used as side splints the screws are fixed to one side, the head being in the bevel of the groove and the butterfly nut on the outside. Of the two I prefer No. 1 on account of its greater strength.



The present specimens are made in oak, but it is probable that beech would be found more efficient, being sufficiently strong for the purpose, and at the same time both cheaper and lighter. I would suggest that they are an improvement on the portable Liston's splint at present carried in the panniers, owing to the fact that they are adjustable and will make two side splints if required.

## A SUCCESSFUL AND SIMPLE METHOD OF CARRYING OUT VACCINATION.

BY MAJOR P. H. HENDERSON.

*Royal Army Medical Corps.*

I SUBMIT this simple method of carrying out vaccination as for some years before and since the lymph was obtained from the Government Lymph Establishment, London, I have followed it with exceedingly good results, while I understand some medical officers have recently had trouble with septic arms.

Up to the present I have had no case of a septic arm necessitating the patient's admission to hospital, while the percentage of successful vaccinations has been high, viz., 94 per cent out of 589 cases covering the revaccinations and primary vaccinations from 1909 to 1913.

*Method Adopted. Preparation of Skin.*—This is cleaned with rectified spirit on cotton-wool, nothing else being used.

Major W. E. Hudleston, who has had equally successful results

amongst the women and children here, washes the arm with soap and water and follows this up with ether, leaving an ether pad on till he is ready to do the scarification; his proportion of successful cases has been 98½ per cent. I have recently seen successful results after preparation of the arm with iodine, but the local reaction was excessive.

*Method of Ejecting the Lymph from the Tube.*—It is immaterial whether the lymph is blown out by the mouth or ejected by a teat. To obviate any danger of contamination from the mouth a piece of cotton-wool is placed over the end of the tube when blowing through it. This is much quicker than using a teat.

The lymph is ejected on to the flat of a scalpel blade; the lymph is then transferred to three or four spots on the arm, and the scarification is performed through these. When the lymph has dried the site is covered with plain sterile gauze and a bandage. It seems to make no difference to the result if a little blood is accidentally drawn during the scarification.

*Site of Vaccination.*—The inner aspect of the left forearm is to be preferred, as it offers the following advantages: (1) It is readily accessible without removing the coat or shirt. (2) With the hand carried in a sling or merely tucked into the coat the site is protected from injury. (3) Should there be any sign of sepsis the forearm is easily immersed in a boric acid bath. (4) It is easy to keep a dressing on this site with a bandage or strapping. (5) When inspecting vaccination marks it is easy to see these without removing shirt or coat. This saves a great deal of time at annual vaccination inspections of troops, &c.

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## A PLEA FOR THE EXAMINATION OF THE URINE OF OFFICERS AND RECRUITS WHEN JOINING THE SERVICE.

BY MAJOR W. S. CROSTHWAIT.

*Royal Army Medical Corps.*

THE brief notes on the following cases show the importance of a careful examination of the urine of all officers, men and boys joining the Service.

*Case I.*—Boy W., aged about 16, service about two years, was brought into the hospital, Upper Topa, in a fit, which was said to have been an epileptic one by those who saw it. I was called to see him at 11.30 p.m. and found him in a state of stupor, pupils dilated, temperature normal, pulse 110, tension very high. His urine was very pale and slightly "milky" in appearance, specific gravity 1006, acid, and loaded with albumin; under the microscope I found pus cells, red blood corpuscles, epithelial casts and debris. The boy stated that he had scarlet fever in

1906 and that it was followed by kidney trouble. His medical history showed that he had never been in hospital since enlistment. He died of acute uræmia within forty-eight hours of coming into hospital.

I know it was not the universal custom when I joined the Service to examine the urine of officers and recruits when they joined, but, of course, it may be now. Evidently this boy had long-standing renal trouble which would have been detected if his urine had been carefully examined when he was enlisted.

*Case II.*—A boy, aged about 18, reported sick complaining of headache; he had about six weeks' service or less. His temperature was normal, pulse 80, tension slightly above normal. (On examining his urine as a matter of routine, I found it to contain a large amount of albumin, which did not disappear either with rest or on a milk diet. So far as I remember now this boy gave a history of having had scarlet fever some years before joining the Service. He was considered medically unfit for further service.

The notes on the following cases show the importance of examining the urine of every case coming into hospital, whether the symptoms and physical signs point to renal trouble or not. A man was admitted to hospital suffering from acute eczema. When he was cured and about to be discharged he developed acute œdema of the lungs and died within about forty-eight hours. His urine was found to be loaded with albumin. In another case a man was brought to hospital in a fit, supposed to be epileptic; he died within a short time. The post-mortem examination showed advanced granular disease of both kidneys.

It seems to be quite as important to make a careful examination (microscopical as well as chemical) of the urine of children and babies as of adults. Stile points out that the examination of the urine of babies is often overlooked, and this examination will often clear up the cause of a hitherto mysterious temperature not uncommonly due to *Bacillus coli* infection. The urine of a baby is no doubt difficult to collect, but it can be done with a little trouble. As a medical resident, I was always taught to examine the urine of every case admitted to hospital, and I still adhere to this rule. If an insurance company will not accept lives without a careful examination of the urine, why should the State, or why should we accept officers or recruits without a similar examination?

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## A NOTE ON THE SWISS ARMY STRETCHER.

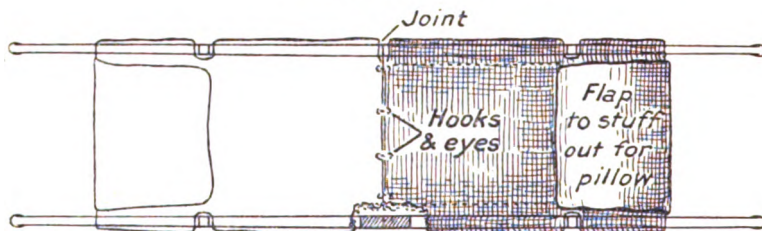
BY LIEUTENANT-COLONEL H. E. R. JAMES, C.B.  
*Royal Army Medical Corps (Retired Pay).*

THE regulation stretcher of the Swiss Army is a jointed one, known as Weber's. It consists of two exactly similar halves, which when fitted together form a complete stretcher. Each half carries a combined

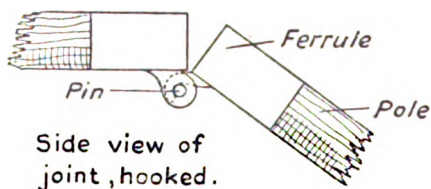
$\frac{1}{2}$  inch to 1 foot



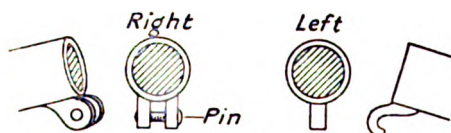
Side Elevation



Plan

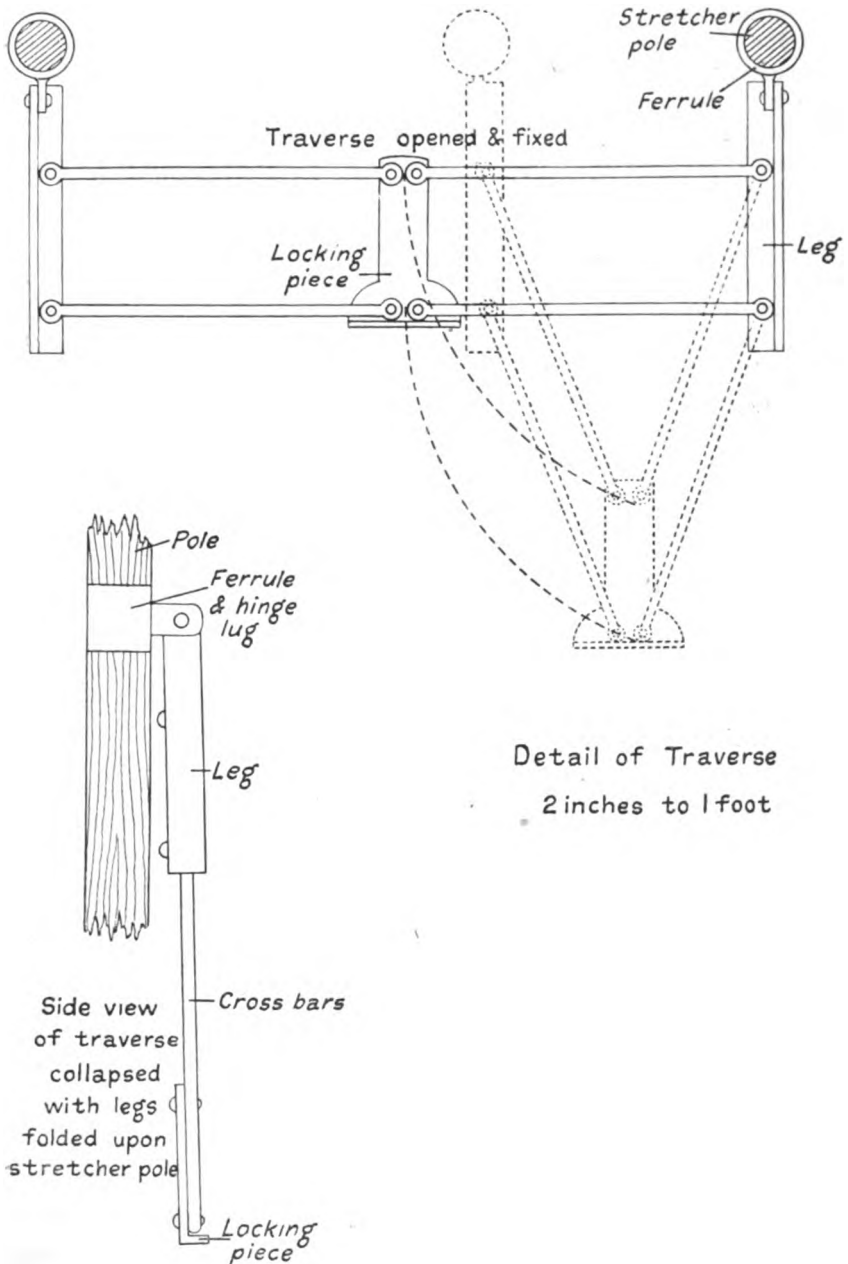


Side view of joint, hooked.



End view of members  
of joint  
about 2 inches to 1 foot

traverse and pair of legs, which, when collapsed, can be folded flat against the handles; the canvas has a flap at both ends, which can be stuffed out to form a cushion. Each half weighs 11 lb., and the stretcher



can support a weight of more than 340 lb. The half-stretcher can be rolled into a compact and portable bundle, easy to carry by means of the sling.

The argument in favour of the system is, that as two men are necessary to carry a loaded stretcher, it is reasonable that not only half the weight of the unloaded stretcher, but half the actual stretcher should be carried by one man and any two bearers can form a complete stretcher. It is particularly suitable for mountain warfare, as the bearer is not inconvenienced by the 7 ft. 9 in. length of the full stretcher pole.

The illustrations given in the trade circular from which the description is taken do not show details of construction, and these have to be inferred with the aid of the text. The accompanying diagrams show what is believed to be the nature of these details. The locking device for fixing the traverse and the legs when the stretcher is prepared is not shown in the diagrams, but may easily be imagined.

To prepare the stretcher each bearer opens his half and fixes his traverse, the poles are then hooked together and the half canvases are fastened by hooks and eyes. The pillow flap at one side is stuffed out. There is a strap and buckle to each half to keep it rolled up, and a sling to carry the loaded stretcher or the rolled-up half-stretcher.

## ARMY BISCUIT ENQUIRY: SUPPLEMENTARY NOTES.

By J. HARTLEY DURRANT, F.E.S., BRIT. MUS. (NAT. HIST.)

AND

LIEUTENANT-COLONEL W. W. O. BEVERIDGE, D.S.O.

*Royal Army Medical Corps.*

(Continued from Vol. 20. p. 634.)

For practical purposes it has been necessary to ascertain the exact average dimensions of the ova of *Ephestia kühniella* Z., and Major S. Lyle Cummins, R.A.M.C., has kindly furnished us with the following careful measurements:—

No.	Length	Breadth
1	1.18	0.66
2	1.20	0.62
3	1.05	0.62
4	1.20	0.64
5	1.20	0.60
Average	1.16	0.63

From these measurements it would appear that if, when screening flour, a mesh of 160 strands to the inch be relied upon to eliminate the ova of *kühniella*, such reliance must rest on the assumption that the ova of this moth always approach the screen broadside-on.

Major J. G. McNaught, R.A.M.C. [JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. 21. p. 136 (1913)] quotes from MM. Lemoine, and Decaux, that *Ephestia elutella* Hb., *Plodia interpunctella* Hb., and *Pyrallis farinalis* L. "only frequent the cases of biscuits from the end of May to the beginning of September: hence the indication to pack the biscuits only in the intervening period of the year." A similar suggestion was fully discussed during this Enquiry, at Woolwich, in November, 1911. Apart from the possibility of placing contracts at any specified date, or dates, a reference to this Journal, vol. 20. p. 627, will demonstrate that, so far as *Ephestia kühniella* is concerned, such immunity can hardly be hoped for during the winter months, since moths are recorded as emerging in September, October, and November, and they continue to emerge plentifully in December, January, &c.; in fact, the species seems to be normally an autumnal insect.

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## Lecture.

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### THE MOBILIZATION AND FORMATION OF MEDICAL UNITS.<sup>1</sup>

BY CAPTAIN AND QUARTERMASTER G. F. SHORT.

*Royal Army Medical Corps.*

I PROPOSE to put before you the following points:—

(1) The system in force by which provision is made during "Peace" for clothing and equipping Reservists of the R.A.M.C. in readiness for mobilization.

(2) Obtaining, storing and preserving, marking, accounting for, inspecting, the turnover and final disposal of the articles so stored.

I select the foregoing headings from my belief that officers of the Corps, with the exception of officers commanding the Headquarters of companies where reservists rejoin, and quartermasters, are less conversant with them than with any other part of mobilization duties. The two officers named become intimately associated with the work during Peace time, in the course of their ordinary routine duty; whereas other officers are simply called upon from time to time to act as members of "Boards" on supplies received, or Stocktaking Boards, and as these duties deal with quantity and quality only, they afford little opportunity of learning anything beyond that.

It may perhaps be considered that an intimate knowledge of these

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<sup>1</sup> Lecture delivered to the Officers, Royal Army Medical Corps, Belfast District.

Mobilization regulations are now being revised, and some of the procedure described is obsolete. (ED.).



## 210 *The Mobilization and Formation of Medical Units*

particular duties is not essential for medical officers, but I can only quote my experience of the early part of the late Boer War, when on arriving at the Curragh to take up the duties of a quartermaster, who had been sent out to South Africa three months previously, I found that no less than four medical officers had been acting as quartermaster, the one relieved by me being a lieutenant-colonel. I did not find either the stores, ledgers, or vouchers quite as up to date as they should have been.

### REGULAR RESERVISTS.

To begin with, we have three distinct classes of regular reservists who join on mobilization being ordered :—

(1) R.A.M.C. : N.C.Os. and men who have been relegated to the Reserve from the Royal Army Medical Corps.

(2) Royal Garrison Artillery, and Infantry : Army Reservists transferred to the Reserve of the R.A.M.C. under Army Orders 3 and 93 of 1909, and 37 of 1911, who train with the Special Reserve. These, I may mention, receive a preliminary training of three months and subsequent trainings of eight days on alternate years.

The procedure adopted on the transfer of N.C.Os. and men of the R.A.M.C. to the Reserve is as follows : The correct measurement of each is taken, entered on Army Form B. 2056, and forwarded to the officer in charge of R.A.M.C. Records.

For the R.G.A. and infantry these measurements are obtained from the Record Offices concerned.

Corps Form 19 is furnished by the officer in charge of records to officers commanding headquarters of companies where men rejoin for the purpose of being clothed and equipped, and, as will be seen by examining this form, it contains all necessary information in respect to the measurements of the men.

The kit to be issued to each man on mobilization is pigeon-holed separately, with the exception of great-coats, trousers, and service dress jackets, which are baled in a store specially set aside for the purpose.

As casualties occur among the men, Corps Form 19 is sent out by the officer in charge of records to various commanding officers apprising them of the names, measurements, &c., of men added to the establishment, to replace others who have become non-effective.

On receipt of this document the stored kits (great-coats, trousers, and jackets excepted) of any men struck off the strength are removed from their pigeon-holes, and the kits of others who have been added to the list are completed as far as possible from them. Army Book 250 is brought up to date, and Army Form H. 1117, showing the name of the man and the size of the articles stored, is prepared.

It follows that the new sizes of garments, &c., required often differ from those in the kits about to be broken up. In such cases the following procedure is adopted :—

Army Form H. 1173 for the additional articles required is prepared by sections, in triplicate, and submitted to the Chief Ordnance Officer every quarter, except when any abnormal increase occurs in the number of men, when intermediate demands may be put forward. To this requisition is attached a statement showing the sizes of articles in store not required and available for disposal to other units or return to Ordnance Stores.

On receipt of the new articles the kits are completed and under the authority of the C.O.O. the surplus articles are disposed of by voucher.

With regard to the great-coats, trousers and jackets, a little more difficulty is experienced and expense to the State involved, as these articles, being baled by machinery in tens, remain so under ordinary circumstances for periods of three years.

For the purpose of illustrating how an exchange of size is effected in these items, let me state a possible case: During the quarter one man only had been added to and one deducted from the strength. John Adams took a size 3 great-coat, 14 trousers, and 12 jacket, baled in three distinct packages. He is replaced by Peter Robinson size 6 great-coat, 22 trousers, and 22 jacket. As complete bales only are to be handled, three containing thirty articles, twenty-seven of which are still required, must be returned to the Ordnance Stores in order that the garments not required may be removed and five garments of suitable size added. They are then re-baled and returned. It thus follows that railway charges would be paid upon twenty-seven garments to and from Dublin, which if stored loosely need not have been removed from the store. It may happen, however, that the C.O.O. would direct the contents of original bales to be disposed of to other units requiring the articles either here, at Holywood or some other near station. Even then, thirty others would be required from Ordnance Stores to replace them. And all this trouble and expense is occasioned by two men.

There is much to be said in favour of baling these goods. The articles are easily handled and quickly checked. The amount of labour is reduced. The possibility of invasion by moth is precluded, a matter of the greatest importance where large quantities of woollen goods are stored, with a very limited working staff, as in the Royal Army Medical Corps; they are also readily got rid of when they have been stored the prescribed period without fear of questions arising as to their condition. The amount of storage accommodation is also reduced.

#### SPECIAL ARTICLES.

Brassards, field dressings, clasp knives and lanyards supplied for "active service," are stored with mobilization equipment for the authorized strength of each unit.

Articles for "special expeditions only" consisting of sea kit bags, helmets and pugarees, are stored at the clothing depot supplying the

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district, and will not be supplied unless specially ordered by the War Office. They will be issued to units at places of mobilization.

### SERVING SOLDIERS.

A word may not be out of place here anent the equipment, clothing, and necessaries to be taken by serving soldiers proceeding on active service. Such articles in possession of the soldier as form part of his active service kit, will be carefully inspected, and any article of clothing that is not in a perfectly serviceable condition and fit for three months further wear will be exchanged for new, or thoroughly serviceable articles.

Infantry reservists are re-measured on coming up for training, and the necessary adjustment made by the O.C. the Depot in the articles stored for them.

As the Royal Army Medical Corps reservists do not train, either annually or biennially, the sizes of clothing, &c., originally stored for them remain the same until they mobilize, when it is not to be wondered at if differences are found to exist, and difficulty experienced in fitting the men. This could, and should be remedied by directing individuals on their anniversary of transfer to the reserve, to fill in a form and return it to Officer in Charge of Records. By this means, or some similar method, can correct sizes be stored for the men.

Clothing and boots of abnormal size are not stored. On mobilization, indents and size rolls (on Army Form H. 1173) would be immediately submitted to the R.A.C.D. through the C.O.O. Boots of special size may be provided regimentally at the rate published in the Priced Vocabulary of Clothing and Necessaries.

### STORING AND PRESERVING.

We now come to the manner of storing the various kits. Each kit, as I have mentioned before, is kept in a separate pigeon-hole, with the exception of great-coats, trousers, and jackets, and is easily accessible at all times for purposes of checking, airing, and turning over. Affixed to each pigeon-hole is a tin frame containing Army Forms G. 1090 and H. 1117,<sup>1</sup> and showing all articles of equipment, clothing, and necessaries comprised in the kit. All the articles except the service dress cap, boots, mess tin and cutlery are contained in the kit bag, which is placed cross-wise in the pigeon-hole. The cap (in paper) lies on the top of the bag; one pair of boots with laces, is placed on either side of the pigeon-hole, the mess-tin in the centre between the boots, with the cutlery wrapped in waterproof paper on the top.

This arrangement may be found to vary slightly in different stores,

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<sup>1</sup> Army Forms G. 1090 and H. 1117 are being combined in one.

the details being left to the discretion of the Officers Commanding concerned.

With respect to the boots, I have found it to be a good plan to place them with their soles facing you, on which I chalk the date of manufacture. Their age can then be seen at a glance, and the necessity of wading through hundreds of pairs when effecting a turnover of those which have been longest in stock is obviated. Boots should be greased with either animal oil, or dubbing about once every six months.

Knives, forks, razors, and mess-tins, must be wiped occasionally with an oily rag. Napthaline should be placed among the loose articles in kit bags, and their contents should be frequently removed from the bags and aired.

#### MARKING OF ARTICLES.

The only article marked during peace is the identity disc, the remainder being marked when men report on mobilization being ordered.

Here let me please give my views on this subject: You will all admit, I opine, that since mobilization is the act of putting into a state of readiness for active service a given number of men, that this should be done with the utmost rapidity, and yet here we find at the very outset the greatest hindrance to the carrying out of this idea, by having to mark every article of kit issued from store to each individual.

As I do not think that anyone here fully realizes what the marking of 115 kits on charge at this station would mean, let me give you a few astonishing figures: In each kit there are 53 articles, including equipment, which require to be marked as follows: On ten, consisting of leather, wood, or metal, 40 letters and 34 figures require punching. On 40 woollen, leather, and other goods 160 letters and 156 figures require stamping either in paint or marking ink, and on 3, 12 letters and 12 figures require burning. This for 115 kits gives a total of 4,600 letters and 3,910 figures to be punched, 18,400 letters and 17,940 figures to be stamped, and 1,380 letters and 1,380 figures to be burned, making a grand total of 47,610 letters and figures to be either punched, stamped, or burned, upon the articles before the men can be disposed of by the quartermaster.

I have personally tested the length of time required to mark one kit, the work being carried out by an expert marker who is familiar with the use of the various tools, and found that the time occupied is 17 minutes; multiply this by 115 and you have at least  $34\frac{1}{2}$  hours lost, I might say wasted, on this work alone, with the probability of the time being considerably added to, as the present marker, being required to join his unit, would be replaced by a stranger, unfamiliar with the work.

I daresay that the original intention of marking the soldier's kit was two-fold, first to enable the articles to be traced when sold or stolen,

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and secondly, as a means of identification of the wearer on the field in case of any casualty befalling him.

As each soldier now wears an identity disc on going into the field the latter reason is no longer apparent, and although I grant you that years ago it was by no means uncommon for men to be charged with making away with portions of their kit, or appropriating the kits of others, it is seldom we hear of such cases now. But even this should not be advanced as a reason for marking the articles, for if the man mobilizes to-day, and disposes of any portion of his kit on the first day he takes the field, the deficiency is met by an issue of unmarked articles, as marking tools do not form part of the equipment of a unit in the field. If then he can be trusted in the field with an unmarked kit why should it not be so issued to him in the first place.<sup>1</sup>

If this matter is seriously considered and the marking dispensed with, units would be rendered fit to take the field days earlier than they now do, and I do not think that the fighting efficiency of the soldier would be affected thereby.

### ACCOUNTING.

I have pointed out to you the system by which articles are demanded from the Army Ordnance Department, and I may say that such demands are always promptly met.

Vouchers in duplicate are received with each consignment; the articles are "boarded" and if found correct, one voucher is signed and returned, and the other filed in its order of sequence to support the entries in Army Book 285, Clothing ledger under Section VI (Receipts).

Any issues which take place from the store are accounted for in the same section under "Issues," and are supported by Army Form G 1033, signed by the receiving officer.

The ledger is balanced for comparison by a board of officers with the stock remaining in store on September 30, and may be balanced on change of command, or change of quartermasters, and whenever the commanding officer considers it desirable to have the stock verified by a Board of Survey, the reports of such boards being duly recorded on Army Form H 1164, and in Army Book 106.

### INSPECTING.

All Mobilization Clothing, Necessaries, and Equipment are inspected every six months alternately by:—

(1) The Assistant Director of Ordnance Stores.

(2) The Chief Ordnance Officer. The result being reported to the headquarters of the command on Army Form G 1097.

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<sup>1</sup> While it is desirable that marking should be carried out as far as possible, revised regulations are making it clear that mobilization is not to be delayed on this account.

(3) By commanding officers as often as considered necessary by them.

(4) By the quartermaster in charge daily.

In addition there is the annual stocktaking board held when the ledger is forwarded to the Chief Accountant for examination, and boards of survey when necessary.

#### TURNOVER.

As a rapid turnover of mobilization clothing and necessities must be always maintained, this will be done within the following periods if possible :—

(a) Caps and all woollen articles not stored in bales, one year.

(b) Baled goods and all other articles not included under (a) and (c) three years.

(c) Combs and metal articles, five years.

These periods should be taken as a limit, but it is not necessary to postpone any turnover until the periods have elapsed, advantage being taken of turning over as opportunities occur from ordinary supplies required by the unit, or by other units attached.

On December 31 each year a manuscript return is forwarded by the officer in charge of mobilization, clothing, &c., to the C.O.O. showing the items of which no turnover has been effected within the above periods, and of which there is no reasonable prospect of securing a turnover within the following year.

On receipt of this return the C.O.O. will arrange for other units within the command to assist in the turnover, or authorize replacement in bulk from the clothing depot supplying the district.

Complete bales only, as I mentioned earlier in my lecture, will be utilized for turnover of such articles as are stored in bales, and no articles of mobilization clothing, necessities, or equipment must ever be utilized for ordinary issue until first replaced by similar articles.

#### FINAL DISPOSAL OF ARTICLES IN STORE ON ISSUE TO N.C.Os. AND MEN ON MOBILIZATION.

Equipment, clothing and necessities in accordance with Army Forms G 1090 and H 1117 which are to be found hanging on each pigeon-hole, will be issued to men who pass the preliminary medical examination. These forms will be signed by each reservist<sup>1</sup> as receipts, and the articles will be struck off charge in bulk after issue.

When clothed and equipped the men are dispatched in batches to their various units, accompanied by nominal rolls, recording the fact that each man has received a complete set of personal equipment, clothing,

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<sup>1</sup> The signature of the reservist on the new form combining Army Forms G 1090 and H 1117 is about to be abolished.

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and necessaries as shown on Army Forms G 1090 and H 1117, Army Forms H 1150 for public clothing and G 1033 for equipment in duplicate being passed to the officer commanding the unit to which the men are posted. One copy of each will be signed and returned to support the "strike off" in the Ledger.

### PERSONAL EQUIPMENT (ACCOUTREMENTS).

There is no time limit laid down for the turnover of accoutrements held on mobilization charge, this being dependent upon the introduction of new patterns, or changes in existing patterns from time to time, by means of War Office letters and Lists of Changes published monthly, all necessary information is circulated for the benefit of officers who may have mobilization equipment on charge.

The principle is that the latest patterns are always allotted to mobilization equipment, while the older patterns are being worn out by the troops.

Army Book 333 has been introduced not only to record the routine turnover of the mobilization stores, with others of the same pattern in peace equipment, but also to form a record of the action taken to obtain later patterns of any stores concerning which information has been published in W.O. letters or in Lists of Changes. In case of doubt as to whether the equipment is affected, reference should be immediately made to C.O.O. of the area.

It is of particular importance to watch for later patterns of stores and the component parts. Items affected should be exchanged for those of later patterns whenever possible without waiting for the future exchange of the whole article, of which the stores mentioned in the List of Changes may be a part. Thus the buckles of a belt may be obtained without exchanging the whole belt.

Army Book 333 is sent to the C.O.O. of the area on April 1, July 1, October 1 and January 1, and he will arrange for the turnover of such later patterns as are received from time to time. Indents will not be required.

Army Form G 919 is furnished on the first of each month upon which all articles due on account of change in pattern, &c., are shown month by month until finally supplied.

Half-yearly, Army Form G 1080 reporting all deficiencies in mobilization equipment is furnished to the C.O.O.

Mobilization equipment is accounted for in Army Book 239 which will be balanced annually on March 31 and forwarded to local auditor.

### SPECIAL RESERVISTS, CATEGORY (A).

Certain new articles for issue on mobilization are stored at places of rejoining for each Special Reservist, Category (A). The additional articles required on mobilization to complete the men to scale will be

taken from the new or part-worn kits kept for issue during the annual training.

The new articles are all stored in bulk (with the exception of great-coats, trousers, and jackets which are baled), differing in this respect from the regular reservist's which are pigeon-holed. Army Forms G 1090 and H 1117 are prepared for each man.

New accoutrements of similar pattern and on the same scale as those issued to regular reservists are stored for these men.

All stored articles are obtained, marked, accounted for, inspected, turned over and finally disposed of under the same conditions as those for regular reservists.

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## Report.

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### REPORT ON THE MANŒUVRES OF THE 4TH DIVISION BEARER BATTALION, HELD AT OSADANO, AMADAGUN, KIOTOFU, FROM AUGUST 14 TO 17, 1912.

BY CAPTAIN A. A. MACNEIGHT.

*Indian Medical Service.*

#### I.—INTRODUCTION.

THE manœuvres were held on the military manœuvre ground situated to the north of the village of Osadano. This ground covers an area of about three square miles of irregular country, including open plain, woods, small hills and valleys, and is intersected by three good roads and numerous rough tracks.

The troops employed were the following: One infantry battalion, two cavalry troops, one bearer battalion. They were housed in military huts situated on the outskirts of Osadano.

The Directing Staff included the Principal Medical Officer of the 4th Division, a lieutenant-colonel of infantry, a major of the transport corps, two principal surgeons, and a principal apothecary.

Medical officers, including some reserve officers, from the different stations in the division attended the manœuvres for one or two days each, for instructional purposes. A class of men, undergoing a course of instruction, preparatory to entering the medical service, at the Osaka Garrison Hospital, also attended for two days for the same purpose.

Visits of inspection were paid by the Commander and Chief of the Staff of the 4th Division. Similar manœuvres are held in each division during July or August of every year.

The N.C.Os. and men of the bearer battalion had been called out for



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their reservists' training about ten days prior to the commencement of manœuvres, and during this period had been trained in barracks in bearer battalion work.

### II.—DIARY OF THE OPERATIONS.

*August 14, 6 a.m. to 10.30 a.m.*—Collection and disposal of wounded during the defence of a position, previously captured and now held by the advanced guard of a column, pending the arrival of the main body.

Half only of the bearer battalion was employed on this occasion, and on all others with the exception of the evening of August 16. A dressing station was opened about 1,100 yards in the rear of the fighting line. The site was close to a single pine tree, and in a marked depression, which afforded good cover. The dressing station itself was intersected by a good country road leading towards the rear to a village where a skeleton field hospital was established. There was no shade from the sun, and the nearest source of water was over half a mile away.

The considerable distance from any water was a marked drawback to most of the dressing station sites during these manœuvres, but this was unavoidable, owing to the almost complete absence of water on the manœuvre ground.

The wounded, after passing through the dressing station, were conveyed in ambulance wagons and on stretchers to the skeleton field hospital in the rear.

*August 14, 7 p.m. to 10.30 p.m.*—Collection of wounded of a force making a night attack on a strong position held by the enemy.

The assault lasted about half an hour, after which the fighting troops returned to their quarters, with the exception of the casualties, who were left on the ground until collected by the bearer company. A dressing station was opened on rough ground, not well concealed from the enemy. The site was bordered by a cart-road leading to a village in the rear. No field hospital was opened, the wounded, after treatment or inspection, being collected in the discharge section of the dressing station, as if for removal to the rear, but this was not carried out.

*August 15, 8 a.m. to noon.*—Collection of the wounded of a force attacking a position held by the enemy.

A temporary dressing station was first opened in a small wood by the medical personnel of the attacking force, but on the arrival of the half bearer battalion, the site that had been chosen was condemned as being too small for the dressing station, which was then opened about 500 yards further to the rear. The position selected was on the side of a road leading to a large village, 1,000 yards still further to the rear, where an imaginary field hospital was established. As the attacking force continued to advance, orders were sent to the dressing station to the effect that it should be closed, the wounded handed over to the field hospital, which

was coming up from the rear, and the dressing station party should advance and re-open in a fresh position. Operations ceased, however, as soon as the equipment had been loaded up, so that the latter part of these orders was not carried out. The number of casualties was few, and these were not dispatched to the dressing station.

*August 15, 7 p.m. to 10 p.m.*—The idea was the same as on the previous evening, the dressing station and field hospital being in the same positions as on the morning of August 14. The wounded were carried to the field hospital in ambulance wagons and on stretchers.

*August 16, 8 a.m. to noon.*—Collection of the wounded of a force attacking a position and compelled to retire.

The dressing station was opened in a large field, quite close to a small inn, on the side of a main road leading, towards the rear, to the village of Osadano. There was a spring of excellent water about 200 yards away. The inn itself was not made use of, on the grounds that it was too small, though rooms were available, in which the wounded might have been treated to greater advantage than in a tent. The site of the dressing station was in rear of the left of the attack, and a temporary dressing station was opened considerably to the right, on a branch road which joined the main road at a point between the dressing station and Osadano. The skeleton field hospital was situated in this village, and wounded were transported direct to it from the temporary as well as from the regular dressing station. The temporary dressing station was not taken over by the bearer battalion, but continued at work until both were ordered to retire on account of the attacking force being driven back. Operations ceased just as the dressing station was closed.

*August 16, 6.30 p.m. to 10.30 p.m.*—Collection of wounded, after sunset, on ground over which a stubbornly resisted advance had been made during the afternoon.

The fighting continued till about 8.30 p.m., when the combatant troops were withdrawn, and, the enemy having then retreated, a thorough search for the wounded, with the aid of lamps, &c., was possible. Before this hour all precautions necessary when working in the vicinity of an enemy were observed. The full bearer battalion was employed, each company collecting the wounded from one half of the ground to be covered. Patients, after inspection or treatment, were collected in the discharge section of the dressing station and loaded in ambulance wagons and stretchers as if for removal to a field hospital, but this was not carried out.

The closure and removal to the rear of the dressing station was ordered, but before the latter could be carried out the dismissal was sounded.

*August 17, 7 a.m. to 11 a.m.*—Collection of the wounded during an attack on a position.

The fighting line on this occasion was more extended than usual. The dressing station was in rear of the right, in a well-hidden depression.

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The discharge section bordered on a good military road, which, concealed from the enemy by high ground, led to the military huts, where the field hospital was supposed to be. A temporary dressing station was opened in rear of the left, in a position invisible to the enemy, but situated nearly a mile from the dressing station, the road to which led over ground exposed to the enemy's fire.

During the transport of wounded from the dressing station to the field hospital, the arrangement for seating three patients in the ambulance wagon was made use of for the first time.

### III.—COMMENTS.

(1) *Issue of Orders.*—All orders were issued verbally at the place of assembly by the officer commanding the force. They were not taken down in writing. With the exception of the special idea for each day's operations, nothing was issued in writing. The officers commanding the various units, on receipt of orders particularly applicable to their units, had to repeat their orders to the officer who had issued them. The site of the dressing station was generally decided by the officer commanding the force and notified in his orders. The officer commanding the bearer battalion on receipt of his orders from the officer commanding the force, called together all the officers under his command, and read to them the special idea for the operations, indicated the site of the dressing station and field hospital, and gave orders to the bearer company commanders as to the area over which each company was to work. On conclusion of the issue of these orders, the Senior Medical Officer assembled the medical officers of the dressing station party, and detailed the area for each section of the dressing station; the officers commanding bearer companies also gave detailed orders to their section commanders, and, when time permitted, explained fully to their companies any special points in the plans for collecting the wounded.

(2) *Medical Arrangements in the Fighting Line.*—Unless a temporary dressing station was to be opened, the temporary stretcher bearers remained in the fighting line, taking part in the action. The stretchers used by these bearers are carried, together with the medical equipment of the regiment, on pack animals, and not unloaded, unless it is decided to open a temporary dressing station.

(3) *Collection of the Wounded.* (a) *By Day.*—The collection of the wounded is carried out very systematically. Each bearer section, under its commander, has allotted to it a definite area from which to collect wounded, and the bearers, after carrying a wounded man to the dressing station, return to their own section commanders for further orders. A bearer section advances generally in close order, until a point is reached near which it is expected that wounded will be found.

Here the order is given to prepare stretchers, and the stretcher squads

extend and start work. In cases where the nature of the ground requires it, a certain number of men are told off for duty as connecting files. These men are taken from stretcher squads and maintain connexion between the section commander and the bearers of the section, and also serve as guides to point out the direction of the dressing station.

One of the criticisms of the Divisional Principal Medical Officer was to the effect that too many men were taken from the squads to act as connecting files, the result being that the majority of the stretchers were left with only three bearers.

When the distance between the fighting line and the dressing station is great, an exchange post is established about half-way between the two. Half the stretcher squads work between this and the fighting line, the remainder between the dressing station and the exchange post. A squad which has carried a patient as far as this point here hands him over to another squad which takes him to the dressing station, while the former squad returns to the front with an empty stretcher.

The "No. 1 bearer" of each squad carries a bandage bag containing spare dressings and bandages. Rifle splints were not made use of, the reason given being that, as damage to the rifle was likely to result, their employment on manœuvres was forbidden, though they are frequently used on active service.

Stretchers were frequently seen with small branches set up to protect the wounded man's head from the sun. The value of this seemed doubtful.

(b) *By Night*.—The methods employed during a night assault, and when wounded had to be collected from ground over which an advance had previously taken place, necessarily differed somewhat. In both cases stretchers were prepared before advancing. The company and section commanders carried white flags (that of the company commander being larger than those of the section commanders) which they waved continuously for the purpose of notifying their positions to the stretcher squads. These flags could be seen at a short distance on not very dark nights, but their real value seemed to be very slight. On the occasion of a night assault on an enemy's position, the stretcher squads advanced in extended order at a distance of about 100 to 150 yards in rear of the infantry, connecting files being employed between the former and the latter.

On the night of August 16 it was supposed that, owing to the nature of the ground, collection of the wounded before sunset had been impossible. As soon as it grew dark the bearer company commander advanced along a path which divided into approximately equal halves the area for which he was responsible. His forty stretcher squads followed him, one behind the other. At short intervals patrols, taken from the stretcher squads, were sent out to right and left to search for the wounded. These patrols then returned to the company commander

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and informed him of the number of wounded unfit to walk, whom they had found. The necessary number of stretchers was then sent out, with the patrol as guide. After leaving a wounded man at the dressing station, a stretcher squad always returned to the company commander's party. When a path crossing the line of advance was encountered, a paper trail was laid to indicate the correct direction. As long as the fighting continued, everything was done as silently as possible, and lanterns, when used, were always held so as to throw the light to the rear.

After the "cease fire" sounded, the search for wounded became less restricted. Lanterns were used in all directions. Orders were shouted from a distance, and the patrols as they moved about called out inquiring for the presence of wounded. On reaching the most advanced position that had been occupied by the fighting troops the bearer company turned about, and all available men being spread out in an extended line the ground was again thoroughly searched on the way back to the dressing station.

(4) *The Dressing Station.*—The relative positions of the sections of a dressing station are usually as follows: (1) Admission section, (2) treatment section, (3) apothecary's section, (4) discharge section. Sheets of paper on which are written the name of each section are affixed to posts all round the boundary of the section, in addition to the distinctive coloured boards.

The medical personnel was originally told off to the different sections, and, as far as possible, remained the same always. When the dressing station is opened by the full bearer battalion, four medical officers do duty in each of the admission, treatment and discharge sections, the two apothecary officers working in the apothecary's section. When the battalion is divided these numbers are halved. On the Senior Medical Officer issuing his orders for the opening of a dressing station the equipment is unloaded. All the panniers are spread out in the apothecary's section, the tents taken to the treatment section, and a supply of wooden poles and ropes for marking out the boundaries to each section. The panniers are opened in the apothecary's section, and materials and appliances at once issued to the treatment section.

A sample being brought from the nearest source of water, it is chemically examined by the apothecary and pronounced fit for drinking or otherwise. Ideas as to what steps would be taken to sterilize water found unfit for drinking seemed to be very vague. It was suggested that utensils would be obtained locally, and the water boiled. There was no evidence of the presence in the medical equipment of any arrangements for water sterilization.

When necessary, the entrance to and exit from and the path leading through the dressing station were improved by the use of implements carried in the equipment. The ambulance wagons and stretchers of the

transport companies are formed up as close as possible to the discharge section. On active service a portion of the discharge section is set apart as a mortuary. On these manœuvres no latrines or kitchens were prepared; on active service they are made by the intendance department, outside and close to the dressing station.

When a stretcher squad arrives with a patient, they deposit him at the entrance to the admission section, where he is taken over by the medical personnel. Full particulars of each man, of his injuries, and as to whether he is sent to the treatment section or direct to the discharge section, are entered here in a register.<sup>1</sup>

A temporary table is usually made by supporting a stretcher on wooden legs. The cases are examined on this. Such as require immediate treatment are sent on to the treatment section. Others, after any necessary readjustment of dressings, are sent to the discharge section. On the tallies attached to cases sent direct to the discharge section a note is made in the admission section, stating whether the patients are able to walk to the field hospital, or require lying down or sitting up accommodation.

Instruments were placed in a large sterilizer, but not boiled; the staff of the operating tent all wore white coats; patients were placed on the table and undressed, and the form of operations gone through in a most realistic manner.

In the discharge section patients were separated into groups according as to whether they were to walk, or to be carried sitting up or lying down. In order to regulate the passage of cases to the rear, it was necessary for an officer from the discharge station to visit frequently the second tent in the treatment section, with a view to finding out the number and requirements of the cases he had to remove. As stretchers or ambulance wagons became available they were loaded and formed up till sufficient were ready to form a party, when they moved off to the rear.

The stretchers used by the assistant stretcher sections are carried, until required, in the ambulance wagons. At night large numbers of paper lanterns are used to assist the work at the dressing station.

In the second line of transport of a bearer battalion are carried rations sufficient for the patients, in addition to what is necessary for the personnel of the battalion.

#### IV.—CRITICISMS.

The object of these manœuvres appeared to be merely the exercising of the battalion in the actual collection and disposal of the wounded. No transport accompanied the troops with the exception of the medical equipment of the dressing station party and that of

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<sup>1</sup> Registers are also kept in the treatment and discharge sections, and the returns are eventually prepared after a comparison of the three.

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the units engaged. On every occasion but one the dressing station was opened in the immediate vicinity of the place of assembly, where the orders were issued by the officer commanding the force. In consequence, no experience was gained as to conditions on the march.

The small number of troops engaged, and the restricted area over which operations were carried out, made the scope of the work extremely limited, compared with what a whole, or even a half, bearer battalion would have to deal with on active service. The nature of the country limited the manœuvre area, but the disadvantage of having only a small force might have been overcome by increasing largely the proportion of wounded. The number of cases brought each day to the dressing station was between fifty and a hundred, generally much nearer fifty.

In the collection of the wounded the command of a bearer company appeared to be much more centralized than would be either advisable or possible in real warfare. Section and group commanders were of little apparent use, as the company commander issued orders concerning the movements of individual stretcher squads.

Discipline appeared to be excellent. Absolute silence was observed in the ranks of bearer companies at work at night. Considering the comparative inexperience in such work of those concerned, the smooth working of the dressing station seemed remarkable.

Only one water-cart was seen at manœuvres: it was an old pattern, with small capacity, and without any means of cooling the water. Tea was brought from the huts in uncovered wooden buckets, from which the men refilled their water bottles. The general preference of the Japanese for warm tea, or even warm water, renders the supply of cold pure water much less necessary with them than with us.



## Echoes from the Past.

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### ON THE TREATMENT OF ARMY SURGEONS.

BY SURGEON-GENERAL P. M. ELLIS.

*Retired Pay.*

IN turning over the pages of an old eighteenth century magazine (*The Carlton House Magazine or Annals of Taste, Fashion, and Politeness*, for February, 1796) which has come into my possession, I came across a letter under the above heading which appears to me of sufficient interest to warrant its reproduction in a journal devoted to the interests of the correspondent's successors of the twentieth century.

“ON THE TREATMENT OF ARMY SURGEONS.

“TO THE EDITOR.

“*December 29.*

“SIR,—I beg room in your extensive Publication for some remarks, which proceed from an hearty zeal for his Majesty's service, and from motives of benevolence to an useful class of men attached to it, viz., regimental surgeons.

“Common report says that these gentlemen are to consider themselves in future as at their *ne plus ultra*; that they are no longer to look up to superior appointments; that the vacancies on the medical staff (therefore the appropriate rewards of their long services) are to be filled up by a succession of young London surgeons.

“If this be really the case it is a manifest proof that the advisers of the measure have never seen actual service; and being utterly ignorant of the nature of it, their advice should be overruled as detrimental to the army; for I will affirm to their teeth, and every experienced officer knows it, that greater experience, abilities, activity and presence of mind, are required in a regimental surgeon in battle (who must have every resource within himself) than are absolutely necessary in a staff-surgeon in a general hospital, surrounded by assistants, and every convenience for the discharge of his duty in safety and tranquillity. And yet, Mr. Editor, strange to tell, the very reverse of this opinion is the ground on which the new system is said to rest, and its abettors think to be believed.

“Serjeant-surgeon Ranby, however, who acquired his experience



from actual service in the field, thought very differently on the subject, which no man better understood, whatever gentlemen, whose campaigns have not extended beyond the sound of the Horse-guards clock, may think.

“This great surgeon relied entirely on the skill and exertion of the regimental surgeons in battle, for preventing the necessity of crowding the general hospital with greater numbers than it ought to contain, causing contagions far more destructive than the enemy’s fire. He required of them, in all wounds of the principal joints, to amputate immediately upon the spot. It was by their effectual precautions and timely assistance, in and after an engagement, that the Serjeant-surgeon expected (to use his own emphatic expressions) ‘that poor creatures under the extreme misery of large lacerated wounds, bleeding arteries and fractured limbs, should escape the abrupt preposterous removal, which brings on the most fatal symptoms, such as there would not be the least appearance of, or even apprehension of, when properly and immediately assisted in the field of battle. Let (says Mr. Ranby), when the army is forming for engagement, the surgeons with their respective mates, of the three or four regiments next to each other, collect themselves in a body (the same to be observed throughout the whole line), and take their station in the rear. Here let the wounded be put under their immediate care and management’—the highest professional trust belonging to surgery!

“Whilst the regimental surgeons are thus engaged in the field of battle, some of your readers will be desirous to know where the new staff-surgeons are to be found, whose superior alertness and activity is to supercede their labours, to the great improvement of the king’s service and the relief of the wounded officers and soldiers in these emergencies. They are to be found at the general hospital, perhaps (sometimes) within the distance of 20 or 30 miles, but as often double or treble that distance from the scene of action. All the important, all the difficult parts of surgery are anticipated by the immediate attention of the surgeons of the line, who, if they are equal to this important charge, become, by long practice at it, the properest persons to succeed to the vacant appointments on the staff, the due reward of services forgone, and to stimulate others to follow their patient examples.

“A regimental surgeon can no more add a shilling to his income than he can add a cubit to his stature; he remains often 20 years on the same slender pay which he first set out upon, and sees during this long probation, every one around him progressively

advancing in rank and pay. He suffers mortifications which, with manly spirit, he banishes the reflection of from his own bosom, keeping steadfastly in view the object of his honest pursuit, an appointment to the staff. If depriving him of this does not amount to an absolute violation of an existing stipulation, it may be regarded at least as a kind of breach of an implied contract, the custom of the army having hitherto given him a prescriptive right to it. The colonels of regiments, and field-officers commanding corps, are deeply interested in their being supplied with proper surgeons; these gentlemen well know that no surgeon (who knows what he is about) will stay in a regiment an hour longer than he can help, if no discrimination is to be observed between the services of half a year and half a century; and the British establishment affords no other than the staff appointments hitherto in general appropriated to that end.

"I will at present only add, that if there were no injustice in the supposed new plan, the impolicy of it is sufficient to set it aside on mature deliberation.

"Yours, &c.,

"EMERITUS."

We may, I think, safely assume that the benevolence of "Emeritus" was not absolutely disinterested, and that he himself was one of the unfortunate regimental surgeons. There would appear, however, to be a good deal of truth as well as justice in his remarks, as in all probability, under the then existing conditions, immediate operation did give the patient the best chance of recovery. We have changed all that; but it will be within the recollection of many that a hundred years later, comparatively recently, a distinguished surgeon at one of the northern universities poured unmerited scorn on the medical officers of the Army on account of their alleged incapacity to perform an abdominal section on the field of battle.

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## Reviews.

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THE TEXT-BOOK ON GONORRHOEA AND ITS COMPLICATIONS. By Dr. Georges Luys. Translated by Arthur Foerster, M.R.C.S., &c. With 200 illustrations and three coloured plates. Baillière, Tindall and Cox. 1913. Pp. xix and 384. Price 15s. net.

This is a translation of the second edition of Dr. Luys' "*Traité de la Blénorrhagie*," of which the first edition appeared only last year. It is an exposition of modern methods of treating gonorrhœa and an appeal to surgeons to abandon haphazard methods in favour of a more intelligent treatment guided in every case by careful diagnosis. One may sum up the author's views by saying that he looks on acute gonorrhœa as a more or less generalized urethritis to be treated with urethro-vesical irrigations without intra-urethral instrumentation, and chronic gonorrhœa as a localized process confined to a few areas which should be searched for and treated by operations and topical applications under the guidance of the eye. He claims for the latter method—which, of course, demands perfect familiarity with the urethroscope—ability to cure practically every case of chronic gonorrhœa. This claim should command the interest of all who realize what a weary business is the real cure of this disease. It certainly seems as illogical to treat chronic gonorrhœa without the help of a urethroscope as to treat chronic middle-ear disease without a speculum.

The first five chapters deal with the history of gonorrhœa, its dangers to the community, the gonococcus and its demonstration and cultivation, the anatomy of the urethra, and the pathology of gonorrhœa. They are excellently illustrated, especially that on the anatomy. The next two chapters are devoted to the symptomatology of acute gonorrhœa and the diagnosis of urethritis. In the former the description appears rather overdrawn, being applicable not to average but to more severe cases, and it seems rather dogmatic to ascribe acute posterior urethritis generally to badly given urethro-vesical irrigations. The chapter on diagnosis contains much useful information and is excellently illustrated. That on urethroscopy, which is illustrated with coloured plates amongst many others is, as might be expected, a most valuable contribution to the literature on the subject. It is especially valuable to English readers as so little has been written in English on urethroscopy. There is a slight error on p. 162, where the writer, referring to fig. 101, surely means fig. 102, which illustrates the position for examination of the posterior urethra.

The chapter on the complications of gonorrhœa which follows, though excellent on the whole, contains a few statements with which it is difficult to agree. For instance, to ascribe balanitis and balanoposthitis to a gonococcal infection limited to the glans, &c., is not supported by facts, and to say that litritis is chiefly caused by clumsy injections is certainly rather sweeping. Especially so as on p. 72 the author mentions the well-known tendency of the inflammation to concentrate round the

glands of Littre. Again it does not seem quite correct to say, even when the inflammation spreads to the periglandular tissue, that the lesion usually opens on the skin; such lesions are common enough in gonorrhœa, and this disease is common enough in the Army, but it would be safe to say that very few of us have seen any cases of urinary fistula. On p. 191 it is stated that when invaded the duct of Cowper's gland soon becomes occluded, converting the gland into a closed cavity filled with purulent material, but on the next page the writer states "it is usually the case" for the duct to remain patent. On p. 195 prostatitis is attributed chiefly to clumsy urethral irrigations, but the author does not explain why this is so unless the explanation is to be found on p. 84, where posterior urethritis is attributed to failure of the irrigating fluid to pass the "membranous sphincter," and consequent driving back of the gonococci into the posterior limit of the anterior urethra. The author is not a believer in the vaccine therapy of urethritis and has very little information to give on this subject. A chapter on the technique of sterilizing urethral instruments, and their aseptic lubrication, a subject to which far too little attention is paid, would have been useful in a work of this nature.

The translation is generally good, but in places one could have wished it had been complete and had not left us half-way between the two languages. This is, of course, a common fault of translations and does not detract greatly from their value, but one cannot help thinking most of them would be pleasanter to read if the translator had always been assisted in the correction of his proofs by someone who understood only English.

After indulging in so much criticism it would be unfair not to mention again the stock of useful information with which this work is filled. It is profusely illustrated and includes a large number of references to the literature of gonorrhœa. Whoever feels dissatisfied with the haphazard methods of treating gonorrhœa, which are still too prevalent, cannot do better than buy this book and study it carefully.

L. W. H.

**DISTURBANCES OF THE VISUAL FUNCTIONS.** By Professor W. Lohmann, Chief Physician to the University Eye Clinic, Munich. Translated by Angus MacNab, M.B., F.R.C.S. With thirty-nine illustrations in the Text, some in colour. London: John Bale, Sons and Danielsson, Ltd. 1913. Pp. 185. Price 15s. net.

A fascinating book, the only systematic treatise, so far as the reviewer is aware, on the psychological aspects of vision. The inherent difficulties of the subject, entailing considerable knowledge of ophthalmology, optics, psychology and philosophy, are great: but the personal charm and transparent clarity of the style carry the most casual reader irresistibly from page to page.

It is difficult to express in a few words the scope of the work; one searches in vain for a new phrase, as Dr. MacNab, the able translator, has searched—not in vain—for new words. "A Treatise on the Psychology of Vision" is a woefully incomplete definition, for problems of pathology, philosophy and optics, illustrative anecdotes, literary allusions, all find their relevance, their appointed place, as parts of a harmonious whole. The book is a scientific manual and something more

—literature: a rarity amongst the hosts of manuals and treatises which are, in Elia's phrase, *biblia abiblia*.

It is impossible in limited space to do more than indicate some of the most interesting subjects discussed with German thoroughness and French lightness of touch in the twelve chapters. The first chapter discusses the three phases of vision—the physical, physiological, psychic—with the signification and importance of vision. In Chapter II—"Blindness, Education of Vision"—the legend of the accentuation of sensibility in the blind is overthrown, and the alleged sixth sense, "sense of place," is conclusively shown to be compounded of several stimuli, auditory impressions, and tactile impulses from the face—the true explanation of Spallanzani's famous experiments with blinded bats. A blind man loses assurance if his face be covered with a close mask; in walking on snow or a thick carpet his judgments about surrounding objects are less keen (through loss of sounds and echoes). "Abnormalities in Central and Peripheral Vision" are discussed in Chapter IV with a wealth of interesting detail and numerous references to the literature of the subject. Chapters VI and VII on the sense of colour and its congenital and acquired abnormalities are very comprehensive, though strangely enough the work of Edridge Green in this country does not appear to be alluded to. Chapter IX deals with "Colour Hearing"—the curious association of an acoustic sensation with the representation of a colour. For the general reader "Memory Pictures" (Chapter XII) will probably prove the most fascinating part of the book, with its allusions to Luther's and Goethe's hallucinations, the famous "rider in the light grey cloak," &c.

Exigencies of space obviously make a serious and reasoned "review" of a work of this importance impracticable: but it is hoped that the foregoing brief impressions may induce others to read and judge for themselves. Human nature being what it is, most of us are apt to look with a coldly critical eye on books "strongly recommended" to our notice: yet it seems safe to predict in the present instance that few, if any, will after perusal consider the laudation excessive or indiscriminate.

Translation is one of the most difficult of the minor arts, and Dr. MacNab is to be congratulated on his conspicuous success: doubtless, as he notes in his modest preface, he has been greatly assisted in his task by the fact that Professor Lohmann, who is quite a master of our language, undertook the revision of the English proofs. He makes out a reasonable case for the coining of some new words, where old ones do not express the precise shades of meaning—"librate," for instance, as applied to retinal images, strange though it sounds, appears to be the *mot juste*.

M. T. Y.

CLINICAL SURGICAL DIAGNOSIS FOR STUDENTS AND PRACTITIONERS. By F. de Quervain. Translated from the Fourth Edition by J. Snowman, M.D. London: John Bale, Sons and Danielsson, Ltd. Royal 8vo, about 800 pp. 510 illustrations and 4 plates. Price 25s. net; postage, inland, 7d.; abroad, 2s.

This book of 800 pages is a translation from the fourth German edition of M. de Quervain's work. It is published by John Bale and Sons, who have produced a handsome volume. The various regions of the body are dealt with systematically, and the diseases incident to each are clearly

described. The text is pregnant with descriptions of actual cases, which are not only of value in themselves, but of great help to the diagnostician in that they emphasize the important symptoms and eliminate side issues. The book represents the fruit of personal experience, and the illustrations, of which there are 510, are original and beautifully reproduced. The translator has performed his part admirably and given to English readers a work of great surgical value in concise and vivid phraseology.

J. W. H. H.

**HINTS FOR REGIMENTAL MEDICAL OFFICERS OF THE TERRITORIAL FORCE.**

By Captain M. F. Grant, Adjutant, R.A.M.C. School of Instruction London Division Territorial Force. London: Forster, Groom and Co. 1913. Pp. 39.

In a small space this pocket-book, briefly describes the duties of a Territorial Regimental Medical Officer at headquarters and in camp.

Most of the recommendations and duties are supported by reference to official books, which makes it a most useful "vade mecum" to regimental medical officers having little or no previous experience.

T. W.

**WOMEN'S VOLUNTARY AID DETACHMENTS: NOTES FOR PRACTICE MEETINGS.** Pp. 88. Harrison and Sons. Price 1s. net.

These notes consist of questions and answers on elementary first aid and nursing, with reference to the official Red Cross manuals. They are intended to assist commandants in conducting meetings when a qualified instructor is not available. The notes have been carefully compiled, but commandants would do much better to trust to the official text-books, from which a more thorough knowledge can be obtained than from a book containing definite questions with, in many cases, rudimentary answers.

C. K. M.

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## Current Literature.

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**Isolation of the *Bacillus Typhosus* from the Fæces.**—In the October number of the *Journal of Hygiene*, vol. xiii, No. 3, October, 1913, p. 335, Carl Browning and his co-workers have called attention to the high value of preliminary culture of the fæces in brilliant green peptone water and subsequent plating on solid substrata, the idea being to retard the growth of *B. coli* without appreciably retarding that of *B. typhosus*, and thus leading to a relative predominance of the latter organism before spreading the culture on plates. The principle underlying this line of work is undoubtedly sound. It is obvious that it is better to retard *B. coli* before plating than merely to retard it on the plates, as in the latter case it is only the size of the colonies and not their number that is diminished. It must have been the experience of all who have worked with Conradi's brilliant green agar that the colonies of *B. coli*, though often so small as to be hardly visible in twenty hours, are present in large numbers, even constituting a menace to the successful

"picking" of the more conspicuous typhoid colonies in their neighbourhood. It is this consideration that has given its great value to Fawcett's modification as, in this medium, the *B. coli* colonies are not merely retarded but also differentiated by a colour change. Browning shows clearly that the optimum concentration of brilliant green is a variable quantity, and, for this reason, he advocates the employment of a series of gradually increasing strengths, the lowest being 0.1 c.c. of a 1—10,000 solution in 5 c.c. of peptone water, the highest 0.3 c.c. of the same. In his hands the subsequent plating of the cultures leads to the appearance of mixed *B. coli* and *B. typhosus* on some of the plates, and to practically pure growths of *B. typhosus* on others, though the best results do not always fall to corresponding concentrations of brilliant green. The following experiments were undertaken to test the value of the new method. To a series of test tubes each containing 5 c.c. of sterile peptone and salt solution were added the following amounts of a 1—10,000 solution of brilliant green: 0.1, 0.12, 0.15, 0.18, 0.2, 0.25, and 0.3 c.c. To each tube of the series was then added 20 c.mm. each of a twenty-four hours' broth culture of *B. typhosus* and a similar culture of *B. coli*, the same volumes of the cultures being spread directly on plates at the same time. The latter procedure showed that the *B. coli* outnumbered the *B. typhosus* by about three to one. After forty-eight hours' incubation, the peptone brilliant green tubes were treated as follows: Two loopfuls of each were added to 1 c.c. of sterile broth, and from the latter two loopfuls were transferred to a plate and spread in the usual way.

From the 0.1 c.c. brilliant green tube	..	<i>B. coli</i> and <i>B. typhosus</i> in about equal number.
" 0.12 "	" "	5 <i>B. coli</i> . Many typhoid.
" 0.15 "	" "	7 <i>B. coli</i> . Many typhoid.
" 0.18 "	" "	Pure culture of <i>B. typhosus</i> .
" 0.2 "	" "	" " "
" 0.25 "	" "	" " "
" 0.3 "	" "	" " "

An opportunity having occurred to repeat the experiment with the faeces of a typhoid carrier, the same procedure was carried out, equal volumes of an emulsion of the faeces being added to each of a similar series of brilliant green peptone water tubes. The direct plating of the faeces showed the carrier to be excreting very small numbers of *B. typhosus* at the moment, only one group of a few colonies being found on four plates. On subculture from the brilliant green tubes, mixed colonies of *B. coli* and *B. typhosus* were found on the plate from the 0.1, 0.12, and only *B. coli* on the 0.25 c.c. tubes, while only typhoid colonies in large numbers grew on the remaining four plates. These results were favourable to a degree that was beyond all expectation, and they lead me to the conclusion that Browning's method is far in advance of any previous process for the recovery of *B. typhosus* from the faeces, but further observations, which should take cognizance of the variety of *B. coli* present, are required before a final judgment can be given.

S. L. C.

**The Cytology and Bacteriology of Condensed Milks.** (F. W. Andrewes, *Journal of Pathology and Bacteriology*, October, 1913.)—Fresh milk from individual normal cows may contain from fifty to over a thousand cells per cubic millimetre, and these cells fall into three main

groups: (1) Large cells of obviously epithelial type; (2) cells resembling lymphocytes; and (3) cells with a polymorphous nucleus, resembling polymorphonuclear leucocytes. There has been much argument as to the nature of the cells in the third group. Winkler, Hewlett, Villar, and Revis have maintained that they are not leucocytes, but are of epithelial origin. Andrewes does not concur in this view. He has examined normal fresh human milk, and by employing Ehrlich's triacid stain arrives at the conclusion that "polimorphs" are abundantly present amongst the mammary epithelium. He has not examined fresh cows' milk in the same way, but would be prepared to find polymorphonuclear leucocytes in similar or even larger numbers. He has carried out observations on sterile, unsweetened and uncondensed high-class preserved milks, and finds the percentage of polimorphs to vary between 57 and 73.5. These figures fall within the limits laid down for normal fresh milk, and may be taken as a standard by which to judge condensed milks in general. In cheap machine-skimmed milk condensed to one-fourth or less of its original bulk, Andrewes finds the average number of cells per cubic millimetre is hardly greater than in a fresh uncondensed milk, the percentage of polymorphs varying from 53 to 74.5. The paucity of cells he attributes to the centrifugalization of the milk during preparation. If a milk of this type is diluted with sterile salt solution and a stained film made with the deposit, an erroneous idea of its cell contents may be formed and the sample pronounced to contain pus. Actual counts of the cells per cubic millimetre of the milk should be made. This precaution is especially needful, because cheap condensed milks are not sterile, and are apt to contain staphylococci in large numbers. The combination in a stained film of the deposit from these milks, of abundant polymorphonuclear leucocytes with many staphylococci may be especially misleading.

Unsweetened liquid preserved milks have no bacteriology, for if they were not sterile they would not keep. Sweetened condensed milks are not sterile. Andrewes found colonies of *Staphylococcus albus* even in a good brand of Swiss condensed milk and *S. pyogenes aureus* almost in pure culture in samples of machine-skimmed milks. He thinks that no exception can be taken to the presence, in reasonable number, of the bacteria commonly found in fresh milk, *Bacillus coli*, streptococci, a few staphylococci and *B. enteritidis sporogenes*, but considers the presence of an almost pure growth of *S. pyogenes aureus* and *S. albus* is a more debatable question. Such growth might be thought to point to the presence of pus, and would suggest that suppurative mastitis must be present in the cows. But Andrewes finds that staphylococci, normally present on the skin and teats of the cow, may escape destruction during the process of condensation, and if only a few survive they may multiply enormously in the condensed milk, which appears to be almost a differential medium for their growth. Hence it would be wrong to assume that a condensed milk contains pus, because it shows an abundant deposit of polymorphonuclear leucocytes and yields an almost pure culture of *S. aureus*. Andrewes, however, thinks that the presence of this coccus "in large numbers is objectionable and should constitute a ground for condemnation, even though the potential harmfulness of such a product is unproven." Efficient pasteurization, before condensation and before



the addition of sugar, should prevent the presence of such organisms in the final product, however difficult it may be to destroy them afterwards.

W. H. H.

**Brilliant Green Broth for Paratyphoid Group.**—J. C. Torrey (*Journal of Infectious Diseases*, September, 1913, p. 263) adds 0.15 c.c. of a 1 per cent solution of Grüber's brilliant green to 10 c.c. of 1 per cent glucose peptone broth which is neutral to phenolphthalein. This is a selective medium for the paratyphoid-enteritidis group, and surpasses malachite green broth in this respect, but it inhibits the growth of *Bacillus typhosus*, *B. dysenteriae*, *B. alkaligenes*, *B. coli* and pyogenic cocci. *B. pyocyaneus* grows well in it.

C. B.

**Infectivity of the Blood in Syphilis.**—Frühwald (*Wien. klin. Woch.*, No. 42, 1913) reports that twenty out of forty-five rabbits into the testes of which syphilitic blood had been inoculated, developed specific orchitis one and a half to two months later. Among the cases from which blood was taken were four of primary syphilis in which the Wassermann reaction was negative: there was also one of latent syphilis in which the only signs were slight enlargement of the glands and a positive serum reaction. His work confirms that of other investigators on the presence of the *Treponema pallidum* in the circulation. It is generally necessary to inject 1 c.c. of blood in order to excite the lesion in the rabbit's testis.

C. B.

**Treatment of Tetanus.**—McClintock and Hutchings (*Journal of Infectious Diseases*, September, 1913, p. 319) find that by means of inoculations of guinea-pigs tetanus toxin can be demonstrated in the blood of infected sheep for four days before the onset of symptoms. The exhaustion caused by the tetanic muscular spasms adds greatly to the danger of death. The treatment of tetanus consists in neutralizing the toxin by means of antitoxin and in controlling the tetanic cramps. They used intraperitoneal injections of chlorbutanol dissolved in olive oil for the latter purpose.

Amputation of the infected limb or part after the onset of tetanic symptoms is of no avail. Neither carbolic acid nor magnesium sulphate injections delay death from tetanus.

C. B.

**Enteric Fever and Epidemic Cerebrospinal Meningitis in the French Army.**—The following extracts from the Epidemiological Section of the Annual Medical Report on the French Army for 1910 (*Statistique médicale de l'Armée*) may be of interest:—

*Enteric Fever.*—The incidence was 2.38 and the death-rate 0.31 per 1,000 of strength; the case mortality was 13.33 per cent. While cases have occurred during the year in most garrisons in France the disease attained its highest incidence in the south, reaching as high a ratio per 1,000 as 23.90 at Marseilles, 22.80 at Toulon and 34.59 at Cahors. In the military area of Paris twenty-two cases were infected while employed on work in connexion with the flooded Seine.

A number of cases in Havre were attributed to the proximity of an insanitary latrine to a barrack block. Flies were reported to be occasionally so numerous that they would fall into the men's soup. This barrack block accommodates four companies, and since 1900 has supplied fifty-eight cases of enteric fever. There was an outbreak of fifteen cases at Mayenne (16.05 per 1,000), the cause of which was not made clear.

The following sanitary precautions were adopted :—

- (1) Observation and isolation in hospital of all cases of fever, malaise, gastric disturbances and diarrhœa.
- (2) Daily inspection of all men in the companies attacked.
- (3) Disinfection of patients' kits, bedding and floor-space.
- (4) Limewashing of the wooden floors with a very hot alkaline solution.
- (5) Supervision of personal cleanliness.
- (6) Supervision of cleanliness and disinfection of latrines and urinals, especially of those belonging to units infected. A cloth soaked in a liquid disinfectant was placed at the entrance to these latrines, and the men were asked to wipe the soles and sides of their boots with this.
- (7) Reduction in the number of drills.
- (8) Distribution of hot tea.

Examination of suspected carriers appears in most places to have been carried out, as well as investigations regarding water supply, infected dust on the floors, &c.

At Fontainebleau several cases were attributed to the insanitary state of the latrines caused by flooding from the river, which lasted over a month and contaminated the floors. The report states that at this time the epidemic was favoured by overcrowding in barrack rooms, insufficiency of washing accommodation and the bad state of the paved floors of the rooms.

At Reims there were forty-one cases, two cavalry regiments being particularly affected. The first case observed was a hospital orderly (infirmier) of the 16th Dragoons, who was suffering from an ambulatory form, and who had remained at his duty. Subsequently occurred six cases in the same regiment; they had all been under treatment in the hospital for other causes and infection was traced to this attendant. The discovery of the cause, followed by the usual precautionary methods, brought the outbreak to an end.

Four other cases occurred among some clerks who were all living together.

At Marseilles there were 101 cases attributed to a contaminated water supply; frequent examination of the water showed that it contained 500 to 1,000 coli bacilli per litre. The civil population was also seriously affected. The customary precautions were taken, but the epidemic continuing to spread, all the recruits in the Marseilles garrison were transferred to other stations in the command.

At Toulon the disease was endemic, and here also the water supply was reported as faulty. The infection of the soldiers was considered to have occurred chiefly at the bars and cafés of the town; fifty-one cases occurred.

On account of the extension of the epidemic the following special precautions were taken :—

- (1) Reservists called up in August were sent to stations outside Toulon in non-infected areas.
- (2) One regiment of infantry was not allowed to take part in the manoeuvres.
- (3) In September the recruits for this regiment were sent to other stations.

Twenty-seven cases occurred in the 7th battalion of chasseurs. Strike

duty and alpine manœuvres exerted an influence in the development of the disease. During the manœuvres this battalion was immobilized as a result, and the 4th company, the most affected, was sent back to barracks at Antibes by rail.

With regard to the army in North Africa the report on enteric fever reads very much like some of our former reports from India and Egypt. There is no mention of antityphoid inoculations.

*Epidemic Cerebrospinal Meningitis.*—The incidence and death-rate were respectively 0·54 and 0·12 per 1,000; the case mortality was 23·49 per cent. Cases occurred in seventy-three different garrisons. In the 3rd Army Corps there was a considerable reduction in the number of cases compared with the previous year. This was attributed to the precaution taken of doing an immediate lumbar puncture on all suspected cases. Prophylactic measures included an examination of the nasopharyngeal discharges of friends and neighbours of infected cases.

At Laval, the 124th infantry regiment had 101 cases between June and September in two separate outbreaks. The total number of nasopharyngeal examinations carried out was 3,609 on 1,250 men, of whom about 20 per cent were found to be carriers; the percentage of men occupying beds next to those who developed the disease, however, was very small. There were complications in about 10 per cent of the cases; special mention is made of two cases of pleurisy, and two of epididymitis.

The barracks were thoroughly disinfected, but further cases showing meningeal symptoms occurred in November, and a specialist was installed at Laval. The cerebrospinal fluid did not in these cases give cultural reactions, nor was Weichselbaum's meningococcus found in the nasopharynx of the contacts examined. The clinical picture was different, there was no eruption, no herpes or ocular paralysis. Gastric symptoms predominated. The tongue was furred, breath offensive and constipation was obstinate. Vomiting was a persistent symptom even after headache, contractions and fever had disappeared. Recovery was rapid and without sequelæ. The expert who had visited Laval in July, and had seen some of the cases in the second epidemic, was of opinion that some of these had belonged to the less severe type; and this is further borne out by the fact that the bacteriological methods employed in July and August had not been very good. Thus while thirty-six genuine cases with eight deaths occurred during the first outbreak, a doubt remains how many of the sixty-five cases with one death in the second outbreak were really cerebrospinal meningitis. Between July and December a number of similar cases had been noted in the town among the children; viz., cases of poliomyelitis with meningeal symptoms, and some with a meningeal condition without paralysis. A similar outbreak had been noted in June and July in a factory. The majority of the soldiers affected were agriculturists or servants by trade. They were mostly strong, healthy people. Of the nine who died, three were addicted to alcohol.

At Guingamp six cases occurred. Extensive nasopharyngeal examinations were carried out with the following results:—

- (1) Among contacts the number of healthy carriers was 12 per cent.
- (2) Among 450 young soldiers of the 71st infantry 6 per cent.
- (3) Among 155 men of the 48th infantry 5 to 6 per cent.

(4) Young soldiers who had joined from infected areas showed a percentage of 18.

The meningococcus was found in the nasopharynx of only one man suffering from the disease. J. V. F.

**The Medical Examination of Candidates for Flying.**—Marine Oberstabsarzt Dr. Huss has recently published a paper (*Veröffentlichungen aus dem Gebiete des Marine Sanitätswesens, Heft 6: Untersuchung auf Gleichgewichtsstörungen bei Fliegern*) on the medical examination of candidates for the flying service, with special reference to the examination of the sense of equilibrium. He recommends a very elaborate procedure for this examination and suggests a uniform method of recording the results obtained. He has drawn up at the end of his report a table with forty-two different columns for recording the results of the examination of the eye, ear and muscular sense.

The eye tests are merely to ensure that visual apparatus is normal; a minor error of refraction, up to 3 D. hypermetropia, is the only abnormality permitted.

A large section of the paper is devoted to the examination of the ear; this is divided into an examination (a) of the hearing apparatus and (b) of the apparatus concerned in equilibrium.

Part (a) may again be dismissed with the statement that defective hearing and middle-ear disease disqualify for aeronautics.

Part (b) requires rather more attention. To carry out the tests on the labyrinth in the inner ear a knowledge of the anatomical position of the semicircular canals is necessary.

The examination is based on the fact that when in the healthy person a flow of the endolymph in the semicircular canals is induced, nystagmus occurs. This vestibular nystagmus must be distinguished from the ordinary ocular nystagmus which occurs in various forms of cerebral disease. It is described as a rhythmical nystagmus, that is to say, that when the eyes are turned, say, to the left, the movement of nystagmus is very marked and rapid, and when they are turned in the opposite direction, i.e., to the right, the nystagmus movement is slow and not well marked.

The writer describes four methods of causing a flow of endolymph in the semicircular canals with a view to inducing nystagmus:—

- (1) Turning movements on a revolving chair.
- (2) Partial cooling or heating of the walls of the semicircular canals by means of irrigation of the external auditory meatus.
- (3) Increased and diminished atmospheric pressure and direct pressure on the membranous labyrinth. (This is done with a Politzer bag.)
- (4) Conduction of a galvanic current.

The first and second tests are the important ones. The first test is carried out as follows:—

The person to be examined is placed on a revolving chair. He is then examined for ocular nystagmus. A pair of non-translucent spectacles are applied, but enough space is left at the sides to allow the examiner to observe the eyes from the side. The patient sits with his head erect and the chair is turned ten times to the right at an equal speed, the ten turns to be completed in about twenty seconds. When

the chair stops the patient turns his eyes to the left at an angle of about  $50^\circ$  and remains so until the nystagmus ceases, the result should be noted somewhat as follows:  $\rightarrow 1, 41$  sec. The same thing is repeated in the other direction, i.e., the stool is turned to the left, the eyes to the right and the effect is noted.

The second test is considered a more valuable one because the labyrinth on each side can be examined separately, and the writer recommends its use in preference to the preceding test.

The ear on the side to be examined is irrigated with water at a temperature of  $27^\circ$  C.; this cools the endolymph and induces a flow in the semicircular canals with a resulting nystagmus.

The rapidity with which the circulation of the endolymph is induced is dependent on the relative position of the semicircular canal to the horizon. The more the ring is brought into its vertical axis the quicker will the flow of endolymph be induced. When the head is held perfectly straight the anterior semicircular canal is at an angle of  $30^\circ$  from the horizontal line. Therefore if the head is bent forward to an angle of  $30^\circ$  the semicircular canal is quite horizontal, and if the head is then thrown backwards to an angle of  $60^\circ$  the ring is brought into the vertical axis. The latter is described as the optimum position and the former as the pessimum position, in other words to induce nystagmus more rapidly by irrigating the ear, the head must be thrown back to an angle of  $60^\circ$ .

Method of carrying out the examination: Examine the ear for perforations, inflammation, wax, narrowing of the meatus, &c., then see if there is any spontaneous nystagmus especially at an angle of  $50^\circ$ . The patient is made to sit; steady his head at an angle of  $60^\circ$  backwards and make him look sideways about  $50^\circ$ . Irrigate the ear with water at a temperature of  $27^\circ$  C. If definite nystagmus occurs, stop irrigating. Very close observation is required; preliminary spasms may occasionally be noticed.

Then see if the nystagmus ceases or is diminished by bending the head forwards to an angle of  $30^\circ$ , and if it returns on bringing the head back to the original position. If no nystagmus is induced try water at a temperature of  $20^\circ$  C. and in addition bring the head into the second optimum position, that is,  $60^\circ$  backwards and inclined  $45^\circ$  towards the irrigated side. If the result is negative try the stimulation of the vertical canal (head  $60^\circ$  backwards and inclined  $45^\circ$  towards the shoulder opposite to irrigated ear).

If all these methods fail to produce nystagmus the result is negative. Brunings has invented an apparatus called an otokolorimeter for exact quantitative examinations. The amount of water required to produce nystagmus is noted in cubic centimetres and he determines the degree of response to stimulation as follows:—

$$70 \text{ c.c. water} = 1; 90 \text{ c.c.} = \frac{2}{3}; 50 \text{ c.c.} = \frac{1}{3}.$$

He has also invented an otogoniometer for fixing the head at the exact angle required.

The next step in the examination deals with co-ordination movements after nystagmus has been induced.

The muscular sense is then examined by directing the patient to walk and hop backwards and forwards with the eyes closed. His balancing powers are also tested on an inclined plane.

J V. F.



**Prevalence of Venereal Diseases among Reservists in the Berlin District.**—Stabsarzt Dr. Hecker (*Deut. militärärzt. Zeit.*, November 20, 1913), has made an elaborate analysis of the incidence of venereal disease among men belonging to the reserve and the landwehr of the Berlin military district. His statistics were obtained from the results of the medical examination of these men when called up for their periodical training. As each man was examined the result was entered on a card and these were sent to Dr. Hecker.

Of the men called up in 1912, the total number found to be medically unfit was 7,709; of this total 20.2 per cent was on account of venereal disease. In contrast to this, venereal disease only accounted for 4.5 per cent of admissions among service troops in the Berlin garrison.

According to Guttstadt's estimate 14.2 per 1,000 of the male population of Berlin were infected with venereal disease.

Among the rejected reservists and landwehr men the proportion of each of the venereal diseases was: Gonorrhœa 65.1 per cent, soft chancre 5.1 per cent, syphilis 29.8 per cent. The percentage of married men was 26.9.

C. E. P.

**Army Medical Service in the Austrian Army.**—Generalstabsarzt Dr. Myrdacz (*Militärärzt*, November 22, 1913), in describing his idea of what the Army Medical Service should be, estimates its proper strength at 2 per cent of the fighting troops. Allowing 10 per cent of casualties among the troops engaged, Myrdacz thinks that 20 stretcher bearers per 1,000 of strength should be able to remove all wounded requiring transport within twelve hours of the termination of the fighting. Myrdacz would like to have a company of medical troops under the command of a medical officer, for each division in the army. He would also like to abolish the present system, under which one-year volunteer surgeons serve for three to six months in combatant units, and have the whole year of service passed in doing medical work.

C. E. P.

**Epidemic of Cholera in the Roumanian Army, 1913.**—Captain Xenophon Roman contributed an article to the *Militärische Rundschau* of September 27, 1913, on the medical service of the Roumanian army, with special reference to the precautions taken to prevent the introduction of cholera by troops returning from Bulgaria.

Medical officers of the Roumanian army are of two classes, viz., doctors of medicine and assistant surgeons.

In 1913 in Roumania there were available for service with the army, 522 doctors and 1,348 of the assistant surgeon class.

On mobilization, 326 doctors, 565 "agents sanitari" and 102 subchirurgi were taken for service. Taking the strength of the Roumanian army at 370,030 men, there was 1 doctor for every 1,135, 1 "agent sanitar" for 632 and 1 subchirurg for 3,333 men, or roughly 1 doctor and 2 assistants to each battalion.

The field medical units were much the same as those of the Austrian army and quite capable of dealing with ordinary sick and wounded, but were not properly equipped to undertake the management of an epidemic of cholera.

A Roumanian officer expressed the opinion that the Roumanian army as a whole was not sufficiently instructed in sanitation in the field.

The first cases of cholera occurred in Bulgaria during the advance on

Sofia; the disease spread rapidly, and in a short time cases occurred in all units of the army. As the whole Roumanian army, consisting of four army corps, advanced along a single road the supply service soon became blocked. Fruit was plentiful, and in default of rations was freely eaten by the troops. This, together with bivouacking on wet ground, induced disturbances of the alimentary tract which rendered the men susceptible to infection. The first cases observed were isolated, but the field medical units did not possess the means of making bacteriological examinations, hence many carriers and early cases must have escaped detection.

The Roumanian Government appointed a commission which drew up the following regulations to prevent the introduction of cholera by the returning troops:—

(1) At each of the two bridges across the Danube a quarantine station was established; each station had a bacteriological laboratory, a hospital, disinfecting apparatus, a rest camp for the men and isolation huts.

(2) Medical officers of units were directed to keep a list of all men who showed any symptoms of intestinal trouble during the return march; on the arrival of the unit at the Danube these men were sent direct to the isolation huts in the quarantine station. All units were ordered to remain for two days in the rest camps before crossing the Danube; during this time medical officers were ordered to make inspections of the men and to send any suspicious cases to the quarantine station.

(3) Troops, while marching back to their stations in Roumania, were forbidden to halt in the towns or villages. Sick were sent to specially appointed hospitals.

(4) Before occupying their barracks, each unit was ordered to camp for five days outside the town; during this period no communication was permitted with the inhabitants.

These measures were estimated to cost £60,000.

Owing to these measures the disease was eradicated from the army. The number of deaths due to cholera was 1,166 in the army, and about 600 in the civil population.

C. E. P.

**Note on Malaria in Mantua.**—Tenente Colonnello Giovanni Bernucci (*Giornale di Medicina Militari*, July, 1913) has contributed a note on the prevalence of malaria in Mantua. This is a town of some 32,600 inhabitants, with a military garrison of about 1,100 men. It is situated on flat ground, and is practically surrounded by lakes and swamps, formed by the river Mincio. During the Austrian occupation it was strongly fortified, forming as it did one of the corners of the "great quadrilateral," and a good many detached forts were built around the town. It has had a very bad reputation for malaria, but since the State has taken the matter in hand by pulling down walls and filling up ditches and swamps, and by the methodical administration of quinine both prophylactically and in treatment, the number of people attacked has decreased gradually, and from 1901, when 2,695 of the civil population, and twenty-five of the military garrison, till 1911, when twenty-six civilians and no soldiers were affected, the immunity has been progressive. The especial point of interest of the article lies in the observation that of the troops (who are quartered in barracks all over the town) those whose quarters were in the detached forts, and on the periphery of the town,

in contact with the lakes and marshes were practically the only ones affected.

The dwellers in the centre were nearly immune. Swarms of anopheles were found near the periphery, but in the centre there were only *Culex*. The town is not a large one, probably about half a mile in diameter, and it would seem as if, finding their prey near at hand, the anopheles do not trouble to extend their flight.

The writer is a believer in prophylaxis by quinine, and exhibits a table which seems to show that the decline of malaria is in direct proportion to the amount of quinine distributed.

In 1901, 2,695 civilians were reported to be suffering from malaria; in that year no quinine was given.

In 1902, 1,277 cases occurred, 38,187 kilos of quinine having been distributed.

In 1910, 33 cases only occurred, 190,570 kilos of quinine having been given.

H. E. R. J.

**German Recruiting Statistics for 1912.**—The number borne on the recruiting list in 1912 was 1,289,868, which is an increase of 17,484 on the figures of the preceding year, which amounted to 1,271,384.

The number borne on the recruiting list was made up as follows:—

Men of 20 years of age .. ..	557,608
„ „ 21 „ „ .. ..	385,163
„ „ 22 „ „ .. ..	294,825
Men above 22 years of age .. ..	52,272

The following comparative table shows the classification of the numbers given above into the various categories during the years 1911 and 1912 respectively:—

	1911	1912	TOTALS	
			1911	1912
Number excluded from military service..	826	916		
Number physically unfit .. ..	35,500	34,211		
Number posted to the "Landsturm" ..	142,307	137,922		
Number posted to the "Ersatz" reserve	92,143	87,706		
			270,776	260,755
Contingent taken for the standing army:—				
(a) Service with arms .. ..	207,741	223,226		
(b) Service without arms .. ..	2,712	2,616		
	210,453	225,842		
Volunteers and men enlisted for special purposes such as schoolmasters ..	37,528	63,682		
Total for the standing army			247,981	289,524
Number posted to the naval "Ersatz" reserve .. ..	2,589	2,501		
Contingent taken for the navy .. ..	13,472	16,491		
Volunteers for the navy .. ..	4,916	5,513		
Total for the navy .. ..			20,977	24,505
Number of men whose service was postponed, emigrants and excess numbers .. ..			731,650	715,084
Total .. ..			1,271,384	1,289,868



In addition to the above the following enlisted as volunteers before reaching the military age (20):—

In the standing army:—					
1-year volunteers	..	..	..	..	1,850
Other volunteers	..	..	..	..	23,775
Schoolmasters specially enlisted	..	..	..	..	32
In the navy	..	..	..	..	3,125
					28,782

(Note.—The total number of 1-year volunteers, including those who enlisted before reaching the military age (20), for the army was 16,158.)

The contingent taken compulsorily for the army and navy was made up as follows:—

Men of 20 years of age	..	..	..	112,624
" " 21 " " "	..	..	..	57,757
" " 22 " " "	..	..	..	67,261
Men above 22 years of age	..	..	..	2,075
Total	..	..	..	239,717

Of the numbers taken compulsorily for the army and navy 148,115 were born in the country, and 91,602 in the towns.

It will be observed that the numbers posted to the "Landsturm" and "Ersatz" reserves were less in the year under review than in the preceding year, and the contingent taken for the standing army was larger in 1912 than in 1911. This distribution was necessary in view of the increased establishment provided for by the Army Bill of 1912. There is a marked increase in the number of volunteers in 1912 both for the army and navy. The contingent taken compulsorily for the navy in the year under review shows an increase of 3,019 men. J. V. F.

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## Correspondence.

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### "THE RADICAL CURE OF SACCULATED INGUINAL HERNIA."

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I beg most heartily to corroborate Major E. E. Ellery's remarks on the "Radical Cure of Inguinal Hernia" in the December number of the Journal. I have operated on the lines he advocates since the year 1907. I was first led to do so by reading in the *British Medical Journal* of January 26, 1907, a short paper on the "Ætiology of Hernia," by Mr. Murray. In the *British Medical Journal*, November 16, 1907, Mr. Murray published a fuller account of his theory, which went far to prove that all herniæ are really of congenital origin. In the same number of the *British Medical Journal* Mr. George Chiene described his operation, which is so simple and satisfactory that I have followed it out, almost exactly as he described it, ever since I read his article. For a full

description of the method I must refer those interested to the original paper, and will content myself here by saying that the sac is exposed at the internal abdominal ring, the proximal end, after ligature, is returned to the abdominal cavity, and the distal end left *in situ*. In uncomplicated and recent cases, the operation takes from a quarter of an hour to twenty minutes. The patient is allowed up as soon as the stitches are removed, and a few days afterwards is discharged from hospital. Mr. Chiene recommends overlapping the aponeurosis of the external oblique, but this is quite unnecessary in recent herniæ of the bubonocoele type which one usually meets in the Service.

The whole question is really one of ætiology. If you believe that a hernia is due to a defect in the abdominal wall then it is reasonable to attempt to repair that structure. If you agree with Mr. Murray that the whole trouble is due to a preformed sac then deal with the sac only. Mr. Murray, in the concluding remarks of his paper, says: "The ætiology of abdominal hernia is not merely of academic interest, but has an important bearing upon the question of treatment. A surgeon who believes that the chief factor in the production of the hernia is the presence of a preformed sac, would, in operating for a radical cure of the complaint, adopt less complicated measures than would be adopted by one who believes that the muscular and aponeurotic structures of the abdominal wall are at fault."

I am, &c.,

FRANK E. GUNTER,  
Major, R.A.M.C.

January 4, 1914.

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### ORGANIZATION OF DIVISIONAL MEDICAL AID.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—At the opening meeting of the United Services Medical Society some very interesting points were raised. Many of us stationed in the provinces, although unable to attend these meetings, take the greatest interest in the proceedings. As the writer happens to be one of these may he be permitted to encroach on your space with a few remarks?

The first point was the proposal to give a battalion organization to the field ambulances of a division. One may presume the battalion would have nine sections or companies. There are, of course, many ways in which divisional medical aid may be organized, and one might sketch out three or four alternative plans, all different to the present organization, any of which would doubtless fulfil its purpose and have something to recommend it. However, it must be remembered that no organization can be devised which will fulfil all requirements, nor can one be found that has not certain inherent disadvantages. This unfortunately is unavoidable from the nature of things, and all that one can do is to

adopt that which has the fewest. Before any change is proposed in our present method of grouping the component parts of a field ambulance, it must be shown that real advantage would follow; that mobilization would be made easier; that training would be facilitated; and that control and employment in the field would be simpler. As regards mobilization with a battalion organization, with the exception of field ambulances mobilizing perhaps at Aldershot, the companies of one battalion would all be mobilizing at different places, so the change would hardly assist in this direction. Training together of a complete battalion would practically never be possible, because exigencies of the requirements of peace preclude, as a rule, a larger unit than the present field ambulance being assembled for field training. Employment or control in the field would certainly not be easier, because the tendency at present is to use the section as the most convenient tactical unit. The present method of grouping three sections appears to be a fair compromise, and fairly convenient for administration. A larger grouping would be cumbersome and a smaller one inconvenient.

If it were possible, there is one change in organization which would have a far-reaching effect, and that is, the organization and employment during both peace and war of medical units should be the same. Then the unit as it existed in peace could be trained for war. War units do not exist in peace time, and the component parts only see each other for the first time when mobilized. They can never be trained together. At present, the officers, N.C.O.s, and men of the Royal Army Medical Corps are given training in "scratch" units. Some go also perhaps to manœuvres, but seldom fill the positions they would take in war.

In criticizing our own defects and in endeavouring to find remedies for them, their real causes must not be forgotten. For instance, for a field ambulance to fulfil properly the function of collecting wounded, to gain and maintain touch with the fighting troops, to follow their movements and understand the same, to carry out the important duties of intercommunication in the field, requires a very high standard of individual and collective training. For the reason above stated this standard can never be reached in peace, and would only be reached in war after some time had elapsed. Too much, therefore, must not be expected from such improvised field ambulances as are put together for field training and for medical manœuvres. Defects and failures should be attributed to their proper cause, and not put down to defects in organization other than the all important one referred to. Similarly, tactical failures should not be put down to faulty principles as at present laid down, but rather to insufficient training and inability to apply these principles from lack of practice.

It will probably never be possible to train fully all our war units in peace, for to do so would necessitate an increase of establishment far beyond that which could possibly be employed in peace except during h

training period. The necessities of the medical service in peace require an entirely different distribution of personnel to that which occurs in war, and yet these same peace duties must go on irrespective of field training needs. Doubtless many have tried to think out schemes to reconcile the needs of both, but all such are bound to fail without a vast increase of establishment. As we are never likely to obtain this we must make the best of it. These points have been dwelt upon so as to bring out the fact that merely changing our organization will not be likely to improve matters while the great, well-known and acknowledged defect, viz., the different organization for peace and for war, must still exist.

Before one considers the equipment and transport of field ambulances, the tactical limitations and necessities of the collection of wounded must be carefully examined.

(a) Amongst brigadiers there is a very strong objection to the employment of such a conspicuous object as an ambulance wagon anywhere near the troops engaged with the enemy, as disclosing the disposition of the troops and as giving "the whole show" away to the enemy.

(b) Equally strong views are held by the divisional staff as to the necessity of keeping all roads clear of medical impedimenta for a depth of at least two miles.

(c) The immediate needs of the wounded require that some sort of dressing station be formed within this zone denied to wheeled transport.

Let us now consider what the consequences of the above are: The use of ambulance wagons as an aid to the collection of wounded until after a victory is declared will seldom be possible. All wheeled transport will have to be parked or otherwise kept outside of the zone denied to wheeled transport. Such wounded who cannot walk and who are not carried to a main dressing station can only be collected in sheltered spots, either to be carried away in ambulance wagons after a victory, or to be left to fall into the hands of the enemy in the case of a defeat. To prevent this would mean not doubling, but rather quadrupling the number of stretcher-bearers now available.

Considering (c): A detachment from the tent sub-division with sufficient material to open an advanced dressing station will need to be organized. The material required will have to be made up into packages of convenient size to be carried by hand, say on a light bamboo pole by two bearers. On the march this equipment would naturally be placed in the small forage cart. The only wheeled vehicle which should follow the advanced dressing station party into action is a water cart. A bearer subdivision with the advanced dressing station party should be the normal allotment for a tactical advanced guard or a small flank guard.

Main dressing stations, if required during fighting, can only be opened outside the two-mile zone. Their usefulness during fighting will be

limited, since very few wounded other than cases able to walk are likely to reach them, unless the numbers of stretcher-bearers are greatly increased.

The work of collecting wounded in detail and the rôle of the main dressing station can only seriously commence after a victory, and only after the latter event can the ambulance wagons be used to aid in the collection of wounded.

In consequence one might almost say that the horsed ambulance wagon is obsolete, since where good roads are available one motor ambulance can do the work of five or even more horsed vehicles. This would certainly apply to England, where there is hardly a spot of country more than half a mile distant from a road practicable to motor-cars. So that for military operations in this country the majority of ambulance wagons might conveniently be dispensed with. However, our Expeditionary Force is organized for service abroad, where such road conditions might not obtain and where the full complement of horsed ambulance wagons, if not present, might lead to serious inconvenience. For this reason, which is the paramount one, it would be distinctly inadvisable to make any reduction.

As regards the forming of spare ambulance wagons into a divisional ambulance column: At first sight there would appear to be much to commend it were it not for the fact that where good roads are available a very much smaller column of motor vehicles would prove more useful. Where good roads are not available all the ambulance wagons would be needed to collect wounded. Give each clearing hospital a few motor ambulance wagons, or even converted motor omnibuses, sufficient to send out two or three mobile detachments, and the problem is solved.

We must, however, arrange in our tactical distribution of medical aid for the ambulance wagons to work only in rear of the main dressing stations during the fighting. Their work will be to carry such cases as are brought in on stretchers to the locality fixed as a link with the clearing hospital. After fighting is over and a victory declared, then the ambulance wagons can be used freely either for continuing this work or for collection as the needs of the situation direct.

I am, &c.,

Shoeburyness,  
January 1, 1914.

S. H. FAIRRIE,  
Major, R.A.M.C.

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Journal  
of the  
Royal Army Medical Corps.

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Original Communications.

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THE TREATMENT OF SYPHILIS WITH SALVARSAN.<sup>1</sup>

BY LIEUTENANT-COLONEL T. W. GIBBARD AND MAJOR L. W. HARRISON.

*Royal Army Medical Corps.*

WE have investigated salvarsan from the standpoint of the treatment of syphilis in the Army, and in doing so have aimed at discovering (1) how to treat syphilis efficiently with the least expenditure of the remedy; (2) whether salvarsan employed in the manner which has produced the best results in our hands offers any advantage over the exclusive use of mercury; and (3) whether it is a sufficiently safe remedy to justify its routine use for the treatment of syphilis in the Army.

We will consider these questions in this order, and endeavour to answer the first two by showing the results we have obtained with salvarsan in treating patients who had previously received no anti-syphilitic treatment. We have purposely not swelled the numbers of cases in our tables with patients who had previously been treated with anti-syphilitic remedies, because their inclusion would have complicated the issue.

COMPARISON OF DIFFERENT METHODS OF USING SALVARSAN.

In order to ascertain the most efficient and yet economical method of treating syphilis with salvarsan, on the principle of

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<sup>1</sup> Reprinted from the *Proceedings* of the International Medical Congress, 1913.



proceeding from the simple to the more complex, we have treated different series of cases on the following seven plans : (1) a single intramuscular or subcutaneous injection of salvarsan ; (2) a single intravenous injection of 0·6 grm. salvarsan ; (3) two intravenous injections of 0·6 grm. with an interval of two weeks between the injections ; (4) an intravenous injection of 0·6 grm. followed at two-weekly intervals by three intravenous injections of 0·3 grm. ; (5) three intravenous injections of 0·6 grm. salvarsan at two-weekly intervals and four injections of calomel cream ( $\text{Hg}_2 \text{Cl}_2$ ,  $\frac{3}{4}$  gr. in each), the whole course lasting one month ; (6) an initial intravenous injection of 0·6 grm. salvarsan, then nine intramuscular injections of mercurial cream ( $\text{Hg}_2$ , 1 gr. in each), at weekly intervals, and, lastly, an intravenous injection of 0·6 grm. salvarsan, the whole course lasting nine or ten weeks ; and (7) a similar course to this, but with injections of only 0·3 grm. salvarsan. Subsequent to each of these courses of salvarsan treatment we have watched the progress of our patients clinically and by means of the Wassermann test. At regular intervals, generally of one month, they have been examined for clinical signs, and once every three months their blood-serum has been tested for the Wassermann reaction. In a certain proportion of cases which have remained persistently free from signs, small doses of salvarsan or neo-salvarsan have been injected six to nine months after the initial course of treatment, with the object of provoking a Wassermann reaction if the disease should be only latent, and otherwise to strengthen the value of our negative examination. A number of our patients left the Army before they had been under observation long enough to be of any use to us. Some were transferred to other stations, but we have kept in touch with these by means of question forms addressed to medical officers, who have also forwarded to us, when requested, at regular intervals samples of blood-serum for the Wassermann test. We are greatly indebted to our brother officers for the help they have given us in this respect.

At an early date we discarded the use of intramuscular and subcutaneous injections on account of the frequency with which local troubles followed them and the high proportion of relapses. Apart from local troubles, the uncertainty of absorption of salvarsan from the site of an intramuscular or subcutaneous injection appears to us to be a very great objection to this method of administering salvarsan. Lieutenant-Colonel W. W. O. Beveridge, R.A.M.C., has very kindly analysed for us nodules or sloughs which have formed as a result of some of these injections, and has found in them quite

large amounts of arsenic many months after the injections which gave rise to their formation. In one case where a cyst at the site of operation in the gluteal region was removed by operation more than a year after an intramuscular injection of salvarsan, he found in one third of it 0.04 grm. of arsenious oxide. The course, consisting of two intravenous injections of only 0.3 grm. salvarsan in conjunction with nine intramuscular injections of mercury, quickly proved to be a failure; relapses occurred in a proportion of the cases before the course of intramuscular injections was complete, and we abandoned this scheme of treatment. For these reasons we have not included in our results cases treated either with intramuscular injections of salvarsan or those which received two injections of 0.3 grm. salvarsan with nine mercurial injections.

For the purposes of comparison, the results of other schemes of treatment may be divided into two groups: (1) Those which followed the exclusive use of salvarsan; and (2) those which followed the use of salvarsan in conjunction with intramuscular injections of mercury in some form. The latter scheme has been subdivided into two classes: (a) A course of three intravenous injections of 0.6 grm. salvarsan at two-weekly intervals in conjunction with four intramuscular injections of calomel within the same month; and (b) a course consisting of two intravenous injections of 0.6 grm. salvarsan separated by nine intramuscular injections of mercurial cream at weekly intervals.

Table I shows the results which followed these different schemes of treatment.

TABLE I.—NUMBER OF RELAPSES WHICH OCCURRED IN PREVIOUSLY UNTREATED CASES OF SYPHILIS.\*

Period of observation from date of last injection	Treatment	Total cases	RELAPSES				Per-centage of total clinical and Wasser-mann relapses
			Clinical		Wassermann without clinical symptoms		
			Actuals	Percentages	Actuals	Percentages	
Six months	Salvarsan only	71	5	7.0	12	16.9	23.9
	Three salvarsan and 4 calomel	63	2	3.1	10	15.8	18.9
	Two salvarsan and 9 mercury	132	5	3.7	15	11.3	15.1
Twelve months	Salvarsan only	48	7	14.5	9	18.7	33.3
	Three salvarsan and 4 calomel	52	1	1.9	12	23.0	25.0
	Two salvarsan and 9 mercury	100	5	5.0	18	18.0	23.0

\* The figures in this and the subsequent tables have been brought up to date.



It will be seen that the smallest percentage of relapses, both clinical and to the Wassermann test, followed the administration of two salvarsan and nine mercurial injections, which gave 5·0 per cent clinical, 18·0 per cent Wassermann, and 23·0 per cent total relapses within one year.

As will be shown later, the proportion of relapses, especially clinical, which followed this combined course was very considerably less than that which occurs under treatment with mercury alone, but we think it very probable that with further experience there will be a still further reduction in the number of relapses. It is interesting that the course consisting of three salvarsan in conjunction with four calomel injections, in respect of both remedies a more intensive treatment, has been followed by more total relapses than two salvarsan and nine mercurial injections, and it seems probable that the better results shown by the latter form of treatment are due to the fact that the course was prolonged over a longer period of time. We are at present treating patients with a course of three intravenous injections of 0·6 gm. salvarsan and ten intramuscular injections of mercurial cream in a period of ten to eleven weeks, but our patients have not been sufficiently long under observation to justify any opinion on its merits.

#### THE ADVANTAGE OF COMMENCING TREATMENT IN THE PRIMARY STAGE.

Besides the improvement to be expected from better schemes of treatment than those we have mentioned, there are strong grounds for believing that when the importance of early diagnosis and prompt treatment of syphilis with salvarsan is more generally recognized there will be a very substantial reduction in the number of relapses.

TABLE II.—NUMBER OF RELAPSES WHICH OCCURRED WHEN SALVARSAN TREATMENT WAS COMMENCED IN THE PRIMARY AND SECONDARY STAGE RESPECTIVELY.

Period of observation from date of last injection	Stage of disease at which treatment commenced	Total cases	RELAPSES				Per- centages of total clinical and Wasser- mann relapses
			Clinical		Wassermann without clinical symptoms		
			Actuals	Percentages	Actuals	Percentages	
Six months	Primary	92	5	5·1	6	6·5	11·9
	Secondary	174	7	4·0	31	17·8	21·8
Twelve months	Primary	70	3	4·2	5	7·1	11·4
	Secondary	130	10	7·6	34	26·1	33·8

In Table II are shown the percentages of relapses which followed when treatment with salvarsan commenced in the primary and secondary stages respectively. It will be seen that the advantage of commencing treatment in the primary stage was especially well marked in the Wassermann reaction, though the proportion of clinical relapses was also markedly smaller in the primary than the secondary cases.

It is only fair to mention here that we include amongst relapses in primary cases all patients who returned with a primary chancre on the site of the original sore, though in some of these cases there is strong evidence in favour of fresh infection from an outside source. For instance, all induration had been absent from the site of the original sore for six or seven months, the Wassermann reaction had been persistently negative during the same time, and patients volunteered the information that they exposed themselves to infection within the incubation period of syphilis, and we think there is a reasonable possibility that the second sore was not a relapse, as we have classified it, but due to a new infection.

The improved methods of diagnosing primary syphilis which are now available justify a hope that before long soldiers will be educated to look with suspicion on every venereal sore, however trivial it may appear, and, helped by the encouragement of medical officers, will report sick earlier than has been the custom. From a very large number of syphilis case-sheets which we have examined we find that in the Army generally for every soldier who commences treatment in the primary stage five do so in the secondary stage. In the London District the proportion of cases which commence treatment in the primary stage has been steadily rising for the past few years, and of our own cases it is now one primary to one secondary. We attribute this improvement to the fact that we have steadily urged men to report sick early, frequently pointing out to our patients that with a microscope it is easy to diagnose a primary chancre when it is no larger than a pin's head and looks no more serious than a slight abrasion, and that under efficient salvarsan treatment the prognosis is so much better in the early primary stage.

#### COMPARISON BETWEEN SALVARSAN AND EXCLUSIVELY MERCURIAL TREATMENT.

In order to compare the results of a course of two injections of salvarsan and nine of mercury, such as we have described, with those which follow the exclusive use of mercury, we obtained from

the Director-General, Army Medical Service, permission to examine the syphilis case-sheets of the Brigade of Guards which were returned to the War Office in the years 1906 to 1912. We extracted from the sheet of each case which we considered had been regularly and efficiently treated with mercury for at least a year, either by intramuscular injections or by inunctions, particulars as to the stage at which treatment commenced, the total relapses, and the total number of days lost in hospital and attending as an out-patient. The results are shown in Table III, in which is also shown the total number of relapses which followed a single course consisting of two intravenous injections of 0.6 grm. salvarsan and nine intramuscular injections of mercury, or three salvarsan and four calomel, as well as the total number of days lost in hospital and attending.

The special points to which we would draw attention in this table are (1) the very marked reduction in the number of clinical relapses shown by the salvarsan as compared with the exclusively mercurial cases; and (2) the great reduction in the average number of days lost by each soldier, especially in hospital. It will be seen that the salvarsan cases spent an average of forty-one days less in hospital during the first year than the exclusively mercurial. Considering that about 2,000 fresh cases of syphilis are admitted every year to army hospitals, we may reasonably expect that without any improvement on present methods the routine use of salvarsan will effect a total annual saving of between 70,000 and 80,000 hospital days. At present the total number of admissions for syphilis to British Army hospitals yearly is about 4,000, but only half of these are fresh cases. On the basis of Table III, the routine treatment of syphilis with salvarsan and mercury will reduce the number of relapses so much that the total admissions to hospitals for syphilis should be reduced from over 4,000 to about 2,300.

It may be argued that in considering the case of exclusively mercurial treatment we have taken account of only clinical symptoms, and that the reduction in the number of relapses following salvarsan treatment is due simply to suppression of symptoms. It will be granted, however, that if the percentage of positive Wassermann reactions is, and remains, lower after salvarsan treatment, the evidence is against exclusively mercurial treatment. The Wassermann test was not applied to the mercurial cases shown in Table III so regularly as to the salvarsan, but from tests applied to 124 other patients immediately after the last course of mercurial injections in the first year the Wassermann reaction was found to be positive to the

original test in over 34 per cent, while in forty-two cases tested only four months after completion of this course the percentage of positive reactions had risen to over 57. The original Wassermann test was applied to 289 patients at Rochester Row only three months after the completion of two years' regular treatment with mercurial injections, and the reaction was found to be positive in over 42 per cent. In the salvarsan series the conditions of examination were more favourable to the discovery of positive Wassermann reactions than in the mercurial; thus, considerably longer periods of rest from treatment had elapsed, and the blood-serum of each of the salvarsan cases was tested at least three times in the year, so that there was a better opportunity of discovering a positive reaction than in the mercurial cases, which were tested only once. In spite of these adverse conditions, the total number of positive Wassermann reactions obtained throughout the year from the salvarsan cases amounted to only 15·4 per cent.

TABLE III.—TOTAL RELAPSES AND AVERAGE TIME LOST BY EACH SOLDIER IN HOSPITAL AND ATTENDING AS AN OUT-PATIENT UNDER TREATMENT WITH MERCURY AND WITH MERCURY AND SALVARSAN RESPECTIVELY DURING THE FIRST YEAR.

Treatment	Total cases	Average number of days in hospital on first admission	CLINICAL RELAPSES				Percentage of clinical relapses	AVERAGE TIME LOST BY EACH MAN IN DAYS		
			Once only	Twice only	Three or more times	Total number which relapsed		In hospital	Attending as an out-patient	Total
Mercury alone	371	42·0	151	115	49	315	83·0	66·2	17·6	83·8
Mercury and salvarsan	152	23·2	6	0	0	6	3·9	25·2	15·8	41·0

\* There is another point in favour of the routine use of salvarsan for the treatment of syphilis in the Army, and it is this. Our examination of the syphilis case-sheets to which we have referred showed that quite 50 per cent of soldiers who contract syphilis pass to the Army Reserve, or leave the Army for some other reason, before they have completed one year of treatment, and it seems to us important, if only for the sake of the efficiency of the Reserve, that, if possible, the treatment should be completed within the first year.

## SAFETY OF SALVARSAN.

Under the question of the safety of salvarsan we will consider deaths, reactions immediately following intravenous injections, and cranial nerve disturbances.

(a) *Deaths after Salvarsan Injections.*—The question of death immediately following an injection of salvarsan is one which is naturally of considerable interest to all of us. Our own experience in this respect has been very fortunate, since in over 2,500 intravenous injections we have not experienced any fatality. From a consideration of the literature on this subject it seems to us that fatalities may be divided into three classes: (a) Those which could have been avoided by attention to well-known contra-indications and by careful technique and after treatment; (b) deaths due to pulmonary embolism; and (c) those in which a series of epileptiform convulsions followed by death has occurred on the third to the fifth day after the injection; the explanation of the last-named is still in dispute. We can serve no useful object by discussing the first two of these, but we would like to offer our views on the third class, in the hope that we may assist in arriving at a correct explanation of the cause of death in these cases, and possibly at some agreement as to the best means of preventing it. There are two explanations of these fatalities. One is that they are due to an exacerbation of cerebral syphilis, a Jarisch-Herxheimer reaction in the central nervous system; and the other, that they are due to salvarsan poisoning. It is urged in favour of the first of these explanations that the patients are almost always in the late primary or early secondary stage, when it is so common for the meninges to be affected, and that the cerebral changes found post mortem are consistent with the view that death is due to poisoning with endotoxins of *Spirochæta pallida*. It must be admitted, however, that if death is due to the release of a large amount of spirochæte endotoxins, it is extraordinary that this should occur so extremely rarely after the first injection, and that it should have such a long incubation period as two or even five days. Our experience of the Jarisch-Herxheimer reaction as it is exhibited in other parts of the body shows that it occurs within a few hours of the first injection. Further, we would expect that an exacerbation of cerebral syphilis so severe as to cause death would surely be accompanied by profound pathological changes in the cerebrospinal fluid. By the kindness of Captain A. T. Frost, R.A.M.C., we have had an opportunity of examining the cerebrospinal fluid and organs of a patient who

died in epileptiform convulsions on the fourth day after an injection of salvarsan. The particulars of the case are as follows: The patient, a soldier, aged 20, suffering from early secondary syphilis, but without any headache, was treated with two injections of 0.6 gm. salvarsan, with an interval of two weeks between the two injections. The urine was tested before each injection and found to be normal. No reaction followed either injection beyond a slight and transient headache after the second. The correctness of the technique of the second injection is vouched for by the fact that Captain Frost administered it himself, and seven other patients injected on the same day suffered no reaction whatever. The symptoms commenced on the morning of the fourth day with severe vomiting, which was followed by a series of epileptiform convulsions, and the patient died in coma twelve hours later. Captain Frost removed 18 c.c. of cerebrospinal fluid some hours before death, and it is possible that it may have been slightly contaminated with blood. He found in it twenty cells per centimetre, but a differential count was not made. The further tests were carried out by one of us, and the reaction of the fluid to the Wassermann, Nonne, Lange, and Noguchi tests was in each case negative. For the Wassermann test an amount of fluid corresponding to ten times the quantity of blood-serum which is usually taken, was used. Beyond the slight increase in cells, therefore, there was no evidence of syphilitic change in the cerebrospinal fluid of this case. The portions of brain sent to us were taken from a temporo-sphenoidal lobe and internal capsule, but in neither of these were we able to find microscopically any evidence of syphilis, nor were there any capillary hæmorrhages such as have been reported by other workers. On the other hand, the renal tubules were filled with blood-cells. It seems to us that we must recognize the possibility of an idiosyncrasy to salvarsan in a very small minority of patients. Fortunately this idiosyncrasy does not become dangerous unless the salvarsan is repeated in full doses at intervals which are too frequent, and for this reason we are now averse to repeating full doses of salvarsan after intervals which are shorter than one month. We admit that the risk of death after more frequent repetition is very slight, but if the same object is served by spacing the injections well out and filling the intervals with mercurial injections, there is no point in running any risk.

(b) *Reactions after Intravenous Injections.*—The causation of febrile reaction, vomiting, diarrhoea, and a few other unpleasant symptoms immediately after intravenous injections of salvarsan

has occupied the attention of numerous workers, but opinions are still somewhat divided on this question. There can be little doubt that before Wechselmann pointed out the importance of using only freshly distilled water and freshly prepared salt solution reactions were much more frequent and severe than they are now. It has not been our experience, however, that the use of freshly distilled water has entirely abolished fever, diarrhoea, or vomiting. We have made observations regarding these symptoms in all our hospital cases with a view to ascertaining their cause. From time to time we have made slight alterations in technique and watched their effect on the prevention of reactions; for some time we took somewhat elaborate steps to ensure that the solution entered the vein at blood-heat, and at others we have varied the strength of the salt solution, but beyond the great reduction which followed the introduction of freshly distilled water and freshly prepared salt solution, no modification in our technique has been followed by any marked reduction in the proportion of cases which suffered from reaction.

It has been stated that fewer reactions follow when the water has been distilled in glass rather than metal vessels; Hort and Penfold believe that a fever-producing agent is aspirated into the metal still as it cools down, and that this explains salvarsan fever; others have suggested that water from a metal still contains metal which acts on the salvarsan and makes it more toxic. We had used an automatic metal still before these suggestions were made, and before deciding to discard it in favour of glass we fitted to it a device to ensure that air which was aspirated into the still when it cooled down should be filtered through dry cotton-wool. The alteration does not appear to have made any marked difference in the number of febrile reactions, nor was the proportion further reduced in a series of cases for which the solutions were prepared with water which was trebly distilled in a Jena-glass still. Lieutenant-Colonel W. W. O. Beveridge very kindly analysed a large quantity of our distilled water, but found in it neither metals nor organic matter. Finally, we have injected fifty-three patients each with 300 c.c. of the salt solution we use in the preparation of salvarsan. One of these patients, a very nervous one, had a temperature of 100° F. on the same evening, but none of the remainder suffered from any reaction whatever. We feel, therefore, that the fever and other symptoms which have followed intravenous injection in a certain proportion of our cases, in spite of our using freshly distilled water, cannot be attributed to the distilled water, the salt solution, or to any contamination with metal.

There are two further explanations which have been advanced to account for the reactions after intravenous injections of salvarsan; one is that they are due to endotoxins from dead spirochætes, and the other that they are due to the direct action of salvarsan. In order to arrive at some conclusion on this point we have classified 976 cases, under different headings, according to the stage of the disease at which they received the injection, the size of the dose, and whether the injection was for the first, second, or third time, and have worked out the proportion of cases under each heading which suffered from diarrhœa, vomiting, rigor, and fever respectively.

We should say that in the great majority of cases these symptoms were very slight; in fact, in the whole series only forty-five out of 976 patients had a temperature over 102° F., and only fourteen of these reached 103° F. or over. Subjective symptoms in most of the febrile cases were generally so slight that if the temperature had not been taken we would have said that no reaction had occurred. Similarly in the case of vomiting and diarrhœa, in the very great majority of cases where these symptoms were recorded, they amounted to little more than some "retching" and a few loose motions.

The numbers of cases shown in some of the groups are too small to allow us to judge their indication anything but broadly. If we may accept it that spirochæte endotoxins would be released in greatest quantities after the first injection of patients in the primary and early secondary stages, we would expect that symptoms due to endotoxins would be most frequent in these cases. Fever occurred most frequently after the first injection of patients in these stages, but diarrhœa and vomiting occurred more often after injection of patients in stages of syphilis when we would not expect any great release of spirochæte endotoxins. The incidence of diarrhœa and vomiting seems to vary very closely with the size of the dose; this does not follow with febrile symptoms. As far as our observations go they seem to indicate, therefore, that diarrhœa and vomiting are due to direct toxic action of salvarsan, while febrile symptoms may conceivably be due to spirochæte endotoxins. Our analysis has further shown us that some patients are more susceptible to salvarsan than others, since we found repeatedly that certain patients invariably suffered from some vomiting or diarrhœa after each injection.

(c) *Cranial Nerve Disturbances*.—Regarding the occurrence of cranial nerve disturbances after salvarsan injections, our experience is only fragmentary, but we include it in this report as an addition to the evidence collected by other workers. In our letters of



inquiry concerning the progress of our salvarsan cases we have made a special point of asking the medical officers concerned to inform us of any disturbance of cranial nerves. Of the 1,052 cases we have ourselves treated with salvarsan two have subsequently suffered from these affections. The details of these are as follows : Gr. B. contracted syphilis, April, 1912, and was treated with 0.9 gm. neo-salvarsan on June 18, 1912, and 1.2 gm. neo-salvarsan on June 25, 1912. The Wassermann reaction was positive on August 2, 1912, and on August 17, 1912, an injection of 0.3 gm. of salvarsan was given. No mercury was administered. On October 18, 1912, he was transferred to Rochester Row, suffering from facial paralysis, and the Wassermann reaction was strongly positive. The cerebrospinal fluid contained 30 cells per centimetre and gave Lange's gold reaction. In the succeeding ten weeks he received three intravenous injections of salvarsan and ten intramuscular injections of mercury. At the end of this treatment the cerebrospinal fluid was examined and found to have five lymphocytes per centimetre, and the Wassermann, Lange, and Nonne reactions were negative. The last note, made on January 14, 1913, showed some improvement, as he was able to whistle slightly. In this case the points of note appear to be that the initial treatment was inadequate and that improvement followed salvarsan treatment when the facial nerve had become affected. Further, the examination of the cerebrospinal fluid at the end of this subsequent treatment showed that, at any rate, salvarsan had not produced pathological changes in the cerebrospinal fluid. The second case contracted syphilis in November, 1911, and was treated with regular injections of mercury, but suffered from frequent relapses and was transferred to Rochester Row on September 13, 1912, with the mucous membrane of the mouth in a macerated and sodden condition, and with psoriasis of the elbows and knees. He was treated with two injections of 0.3 gm. salvarsan, but no mercury was given as he had previously shown some intolerance of this remedy. In January, 1913, he was again transferred to Rochester Row, this time suffering from the same condition of the mucous membrane of his mouth and with facial paralysis. The Wassermann reaction was negative in the blood and cerebrospinal fluid. The cerebrospinal fluid contained eight cells per centimetre and gave negative Lange and Nonne reactions. He was treated with more salvarsan, in conjunction with mercurial injections, but has shown no improvement. The points of interest in this case are the very small quantities of salvarsan which were administered in the first instance and the negative findings in the cerebrospinal fluid at the time he was suffering from facial

paralysis. Considering that it is now admitted that syphilitic cranial nerve disturbances are constantly associated with pathological changes in the cerebrospinal fluid, and considering also the very small doses of salvarsan administered to this patient, it is open to question whether the facial paralysis had anything to do either with syphilis or salvarsan.

Two other cases of cranial nerve disturbance after salvarsan administered in other hospitals have also been treated at Rochester Row. In the first, facial paralysis developed six months after an intramuscular injection of salvarsan and immediately after a motor trip. He was treated by us with an intravenous injection of 0.6 grm. salvarsan, and the facial paralysis had disappeared on the third day after the injection. No examination of the cerebrospinal fluid was made, so that it is impossible to say whether the facial paralysis in this case was due to syphilis or not. At any rate it is fair to say that the second dose of salvarsan could have had no toxic effect on the facial nerve, even in its damaged condition, seeing that the patient had recovered by the third day after it.

The remaining case shows the importance of having a clear understanding as to the causation of these cranial nerve disturbances, since we believe that if the patient had been promptly treated with salvarsan when the nerve disturbance first made its appearance much damage might have been prevented. This patient was treated with 0.6 grm. salvarsan for secondary syphilis in February, 1912. No other treatment was administered until July, 1912, when he was admitted to hospital suffering from paralysis of the ophthalmic branch of his left fifth nerve, with conjunctivitis and anæsthesia of the left forehead and temple. He was treated with mercury and potassium iodide by the mouth, but the cornea became more and more opaque till November, 1912, when he was transferred to Rochester Row. On transfer the corneal opacity was so great that perception of light had disappeared. The Wassermann reaction was positive in the blood and cerebrospinal fluid. The cerebrospinal fluid contained 140 lymphocytes per centimetre and gave positive Lange, Nonne, and Noguchi reactions. Under treatment with repeated small injections of neo-salvarsan, in conjunction with mercury, the anæsthesia disappeared, but the cornea cleared only slightly and there was no improvement in vision. In this case the cerebrospinal fluid showed evidence of syphilis of the central nervous system, and the improvement at such a late stage indicated that much might have been done by the prompt administration of salvarsan before the nerve had become irreparably damaged.

The evidence which has been produced by Benario and by

Dreyfus to prove that cranial nerve disturbances after salvarsan are due to syphilis and not to the remedy must be familiar to all, and we would only add the valuable evidence of Captain A. T. Frost. This officer had six cases of cranial nerve disturbance in the first hundred he treated with salvarsan. Five of them had received a single injection of 0.4 gm. salvarsan, or less, but no other treatment. The sixth had two doses of 0.3 gm. at twelve days' interval, and no other treatment. Captain Frost treated five of these cases with full doses of salvarsan as soon as the nerve disturbances appeared, and the symptoms disappeared in all of them.

We have related a case in which we think that the withholding of salvarsan as soon as the signs of cranial nerve disturbance appeared was responsible for much of the subsequent damage, and we think that the sooner this "bogey," the so-called neurotropic effect of salvarsan, is destroyed the better. The lesson we learn from these affections is that the initial course of salvarsan must be prolonged and thorough; that careful subsequent observation must on no account be neglected; and if, unfortunately, the patient subsequently shows signs of cranial nerve trouble, no time must be lost before commencing salvarsan treatment, since delay involves a risk of irreparable damage to the affected nerve.

#### SUMMARY.

(1) We have obtained the best results with a course of two intravenous injections of 0.6 gm. salvarsan and nine intramuscular injections of mercury prolonged over nine or ten weeks, but the indications at present are that a course of three salvarsan and ten mercurial injections will be followed by still better results.

(2) Under salvarsan treatment primary cases suffer so much less from relapse than secondary that it is worth every effort to ensure that as many patients as possible are treated in the early primary stage.

(3) Even if no improvement is made in the method of using salvarsan, which has given the best results in our hands, its routine use for the treatment of syphilis in the Army is likely to effect an annual saving of 70,000 to 80,000 hospital days—an economy equivalent to the cost of keeping a battalion of infantry in hospital for three months.

(4) Salvarsan is a sufficiently safe remedy to justify its routine use for the treatment of syphilis in the Army, but it must be entrusted only to those who are thoroughly acquainted with its indications and contra-indications and the technique of its administration.

## THE BEST METHOD OF STAINING *TREPONEMA PALLIDUM*.

By COLONEL C. BIRT.

**T**HAT syphilis can be aborted is a fact; the reports of numerous observers in all parts of the world prove this; the chancre heals, no secondary manifestations appear; the Wassermann reaction remains negative, and the human body is restored to its original state, for re-infection becomes possible. The condition essential to success is that treatment shall be begun immediately the sore is visible, when it seems no more than a slight excoriation or a minute papule which hardly attracts notice. By the time that induration is evident, animal experiments show that the treponemata have invaded the blood-stream, and have been distributed throughout the body. A heavy responsibility, therefore, is thrown upon the surgeon who is called upon to diagnose the most trivial abnormality of the genital organs after exposure to infection. He must collect the serum which exudes from the abrasion, papule, or ulcer, after lightly scraping the margin and rubbing the surface with a pledget of dry cotton wool, or with one soaked in spirit. This exudate is then examined at once for *Treponema pallidum* with the dark-ground condenser, or by the Günther Wagner pelican black, or collargol methods. If the necessary equipment is not available, the surgeon has hitherto been obliged to send the serum in capillary tubes to the appointed pathologist. This is not always a satisfactory mode of procedure, since the treponemata may disappear during the delay in transit. Until recently dry films of suspected material were of little use for the detection of the treponema. The pelican black or collargol method is not applicable to them, for in these processes only the spaces occupied by the spirochætes are visible as transparencies in the dark background; hence these substances must be mixed with the liquid serum.

*T. pallidum* has little affinity for aniline dyes. This spirochæte is stained very faintly by Leishman's or Giemsa's fluids; gentian violet, recommended by Herxheimer, gives no better results; only a very small proportion of the treponemata present in the film are made apparent by any of these stains. Moreover, the search is very fatiguing to the eyes; in a case investigated by the writer, the examination was continued for four hours before *T. pallidum* was discovered.

## 262 *The Best Method of Staining Treponema Pallidum*

Shortly after Levaditi published his silver method of staining *T. pallidum* in sections, Flexner, Stern, and others employed a modification of the process for demonstrating spirochætes in films; but many attempts made by the writer ended in failure on account of the thick deposit of silver in every part of the slide, which obscured everything. Fontana (*Pathologica*, October, 1912, p. 583) has overcome this difficulty by adding a trace of ammonia to the silver solution, and has perfected a rapid and effective method of staining *T. pallidum*, which surpasses all others. The process, slightly modified by Tribondeau, was described in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, August, 1913, p. 243. Fontana's latest contributions on the subject appeared in *Derm. Woch.*, March 15, 1913, p. 301, and *Pathologica*, April 1, 1913, p. 205. The films of the suspected material are dried in air; they must not be fixed by heat. Hüge's fluid, which consists of 1 c.c. of acetic acid, 20 c.c. of formalin, and 100 c.c. of distilled water, is poured over them, and is renewed several times in the course of a minute. After washing with water, they are treated with the mordant, which is a five per cent solution of tannic acid in a 1 per cent watery solution of carbolic acid. The slide covered with the mordant is heated till steam arises, left for half a minute, and then washed with water for fifteen to thirty seconds. Without drying, the silver stain is next applied. This is a quarter per cent solution of silver nitrate in distilled water, to which ammonia has been added with a capillary pipette until a slight turbidity is evident. If excess of ammonia is introduced, the fluid becomes clear again, and is useless for staining purposes; a trace of ammonia is all that is required. This silver solution is poured on the slide, which is heated till steam is given off, and left for half a minute. The slide is then washed with water, dried with blotting paper, and mounted in xylol balsam if permanent preparations are desired, since cedar oil soon causes the spirochætes to fade. The jet-black treponemata stand out prominently on the clear background, and appear to be much thicker than when stained with aniline dyes. They may be identified with the one-sixth objective. They attract the attention immediately, so that if they are present in the film, they can be detected in a few seconds or minutes. Major L. W. Harrison has supplied the writer with sera from sores in which treponemata were seen under dark-ground illumination; many silver preparations have been made, and the treponemata have been found in all. The writer is impressed with the ease and certainty of the process. It is not necessary to be

accurate in the strength of the silver nitrate solution ; a crystal of the salt dissolved in 2 or 3 c.c. of distilled water in a test-tube, to which is added a minute drop of ammonia from a capillary pipette, gives satisfactory results.

Fontana's method of staining *T. pallidum* is destined to be of great value for the diagnosis of syphilis in places remote from a laboratory, where only dried films of the suspected material can be prepared. The detection of *T. pallidum* in such a film is more easily and quickly accomplished than the discovery of a parasite in a film of malarial blood ; hence the prompt recognition of an infecting sore is within the range of everyone.

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## SOLUTIONS.

BY COLONEL R. H. FIRTH.

A SHORT time ago I submitted an article to this Journal on Colloids.<sup>1</sup> As a corollary and complementary to that article, this is submitted; it is conceived and written in no spirit of didacticism, but as an attempt to help others, perhaps less fortunately placed than myself, to get in touch with the drift of modern scientific thought in regard to some matters concerning which information is scattered and often hidden in papers and books, not accessible to the many. What follows is not chemistry, neither is it pure physics; it may best be defined as an attempt to write a readable article on an aspect of physical chemistry. Pure chemistry deals with a vast number of substances, but interests itself with but a few of their properties; physics deals with few substances, but analyses their phenomena critically. The child of these parents is physical chemistry, and from them inherits the characters of both, and, to-day, is the pivot upon which several sciences associated with our profession turn, besides affording a fine school of exact thought or reasoning for us all. True, the subject is not devoid of technicalities, and, if handled thoroughly, bristles with mathematical arguments; but, as one's object is to make the article readable and intelligible to the average man, one has attempted to deal with the subject in some way historically, showing how the older theories of solution have led up to modern concepts of the atom and molecule, also how from these the present-day ideas of ions and electrolytic dissociation explain the phenomena of solutions on a physical basis. Even for the casual reader, it is hoped that the article may not be uninteresting.

## I.

An early Aryan myth states that primitive matter was a solution, out of which the solid earth crystallized. Later, imbued with the idea of four elements, we find Anaximenes regarding air as the primitive world-stuff; similarly, Heraclitus regarded fire, and Xenophanes regarded earth. On the other hand, Thales described water as the chief origin of all things. The transmutability of the four elements was taught by Empedocles and developed by Plato and Aristotle. All these thinkers had observed the change of

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<sup>1</sup> Published in the February number.

water into steam, and vice versa they had realized also the fact of the deposition of solids from solutions or suspensions, and from the phenomena of water gained their chief experiences. Even when dealing with the metals and their transmutation, the condition of "fluidity" was an essential factor in their reasoning. We trace this in their long dissertations on the fluid metal mercury, and upon the phenomena associated with the heating of lead. The dominancy of the liquid state was clear to those men, and is traceable through the Middle Ages to the seventeenth century, and finds summation in the words, *corpora non agunt nisi soluta*. Further, as the solubility of a substance was thought to be the essential condition for its entering into chemical reaction, the great problem of chemistry was to find a solvent for all substances. We see this manifest in the "alcahest" of Paracelsus and in the life-elixir of the alchemists.

As far back as 460 B.C. Democritus propounded an atomic theory in which matter consisted of discrete atoms with empty interstices. Plato taught the same, but Aristotle opposed the conception. Owing to Aristotle's teaching, the atomic theory hung fire till 1619, when Gassendi taught that solution depended upon the particles of a substance entering into the pores of a solvent. Later, Lemery in 1675 explained the capacity of acids as metallic solvents to be due to the acid particles having very sharp points, whereby they entered easily the metallic particle, and so tore them asunder. The alkalis were thought to possess pores in which the sharp acid particle points were broken off, so that it lost its solvent powers and a salt resulted. These crude ideas of interstices in solvents naturally did not explain all things; then came Newton's idea of gravitation or a force which was able to bind together two different substances and cause their union in a new system. Similarly, dissolved molecules were gifted with a repulsive force against each other. But even these ideas of Newton did not meet all cases, and it was difficult to maintain the parallel between affinity and gravitation. To get over this, Buffon argued that the form of the molecules varied, and that a similarity in form must prevail between two substances which mix with each other in a solution, or *similia similibus solvuntur*.

It was evident in those times that the solution of a salt in water was a process of a much simpler nature than the solution of a metal in an acid. Lavoisier distinguished between the two by calling the former a simple solution and the latter dissolution; he also appears to have appreciated the fact that solubility increased



with temperature. His reasoning was that, if one heats a salt to a sufficiently high temperature, it becomes liquefied just as by the use of a solvent. Obviously, if heat and a solvent are applied simultaneously to the salt their concurrent action will be greater than that of either alone, and solubility should increase with temperature. But Lavoisier did not know that some substances diminish in solubility with increasing temperature. Even liquefaction is not perfectly analogous to solution, otherwise two liquids would mix in any proportions; we know this to be true of water and alcohol but not true of water and oil. The ideas of Lavoisier were not accepted by the majority of chemists in his day. Later, Richter in 1793, expressed the view that a certain affinity was necessary for solution, while Berthollet held the opinion that solutions are typical chemical compounds of variable proportions, and that there was only a difference of degree between a solution and a well-defined chemical compound. For these reasons he denied the law of constant proportions, and argued that not only the solution of solid or liquid substances in liquids, but even the solution of gases in liquids is due to a chemical process. In the latter case, the amount of gas dissolved is dependent on the pressure, and for weak solutions proportional simply to that pressure. It is possible to conceive that an attraction takes place between the gas molecules and the solvent, but if the concentration of the gas molecules is less in the solution than in the gas above it will be necessary to suppose that the attraction of the gas molecules to a fluid, such as water, is less than that to the sparsely distributed water molecules in the gas-phase. This we know to be quite untenable. However, from this time dates the still discussed question, whether a solution is a chemical or a physical process. Some arguments in connexion with this problem are more conveniently considered later on.

Soon after this, or in 1803, Dalton advanced his atomic theory as a variation on that of the Greek philosophers. The latter had only said that matter was built up of atoms of different size and form; they did not recognize what we call elements, for their elements corresponded to what we consider to be qualities, and they did not recognize that the atoms of the same substance have always the same mass. Dalton was the first to explain how the atoms of the same substance must have always the same mass, and later evolved the law of multiple proportions. Then came Gay-Lussac's discovery in 1805 of the fundamental law that the volumes of two gases, constituting a compound, stand in a simple

numerical relation, as hydrogen and oxygen constituting water in the proportion of 2 to 1, or of hydrogen and nitrogen entering into ammonia as 3 to 1. This discovery led to the law of Avogadro, or that a given number of molecules of any gas at a fixed temperature and pressure fill the same volume. Coincident with these researches, notable advances were being made in quantitative measurements, by Berzelius and Dalton, so that by 1820 the atomic theory was established firmly. A few years later, the mechanical theory of heat received general acceptance, and gradually the kinetic theory of gases was developed by such men as Clausius and Maxwell. These advances, coupled with Brown's discovery of the so-called Brownian movement of particles, slowly prepared the way for the modern conceptions of the atom and molecule.

## II.

The investigations following the discovery of the Brownian movement of particles showed that the motion increases with the smallness of the particles, the fluidity of the medium, and the temperature. In fact, it was obvious that the Brownian movement is analogous to the motion conceived to be associated with the molecules of a gas. This interesting phenomenon of molecular movement was first critically investigated by Ehrenhaft, who worked on suspensions in air, obtained by evaporating silver in an electric arc. The vapours condensed to minute drops, and these, by Stokes's law, fell the more rapidly as their magnitude increased. Ehrenhaft separated the particles from each other, according to their size, and having estimated the time required for their subsidence was able to calculate their dimensions. Not only Ehrenhaft, but other workers determined the fact that each particle of matter and even droplets of water are electrically charged to varying amounts, and from this class of work is deduced the generalization that there exist ultimate minute quantities of electricity, which are all of the same magnitude, and that one of these electrical particles, now called electrons, is that which is united with a monovalent ion. The size of this ultimately small quantity of electricity is about  $46 \cdot 10^{-10}$  electrostatic units. This conception of the atomistic structure of electricity and of there being an electric charge on the ion has had an important bearing on the theory of solutions, as will be apparent later. Assuming, as we must assume, that a single particle has an electric charge, and if that charge be  $n \times 10^{-10}$  electrostatic units, then the number of molecules is  $n$  times less. Expressed practically, this

means that a charge of  $10^{10}$  electrostatic units per particle corresponds to  $1.29 \times 10^{20}$  molecules in 1 c.c. of a gas at  $0^\circ \text{C.}$  and 760 mm. pressure, or just  $28900 \times 10^{20}$  molecules in 1 gramme-molecule. As matters now stand, we see how the modern conception of the electron, and through it of the atom and molecule, is traceable to the observations of the movements of small suspended particles in a liquid medium. From one's previous article it will have been gathered that a system of that nature is called a colloidal solution and that the electric charge on individual particles accounts for the essential characteristics of colloids; we have now to appreciate the fact that the presence of an electric charge upon the ions of a chemical substance accounts for the essential reactions in ordinary solutions. This conception is associated intimately with that of dissociation.

The theory of dissociation, or that which indicates that salts in solution are partially dissociated into their ions, the acids being regarded as hydrogen salts and the bases as hydrates, is really not new, for it was latent during many years. That this is so, is shown by the fact that Newton regarded the tendency of dissolved molecules in a solution to get away from each other as due to reciprocal repulsion of the dissolved molecules. What really caused repulsion and attraction, he did not know, but the germ of our present-day notions is there. These present-day notions are intimately related to the idea of an analogy existing between the gaseous and dissolved states of matter, and even this idea is traceable in the writings of Gay-Lussac. He says, "As the effects of affinity change but slowly with temperature, whereas dissolution (solubility) is in a high degree dependent on it, it is difficult to avoid the assumption that in dissolution as well as in evaporation the product is limited, at a given temperature, by the number of molecules which are able to exist in a certain volume of the solvent. They are separated from this, just as gaseous molecules are precipitated by a lowering of temperature." He amplifies this statement by another to the effect that, when the solutions of two salts of different acids and bases are mixed, all the possible four salts are formed. His example was a mixing of potassium sulphate with calcium acetate, in which mixed solution he said there existed not only potassium sulphate and calcium acetate but also potassium acetate and calcium sulphate. His view was that, if one of these four salts be very slightly soluble, so that the solution is supersaturated with regard to it, then it is precipitated, and therefore new molecules of calcium sulphate may be formed in the liquid and a further precipitation occur. In the

language of that day, this "indifference of permutation" between the acids and the bases present in the salts was called "equipollency." As we shall see later, the facts find a simple explanation through the modern theory of electrolytic dissociation.

This nebulous conception failed to grasp the problem completely and it was not till 1885 that van't Hoff, by showing the widely extended analogy in their physical and chemical behaviour between substances in high dilution and gases, demonstrated how near the truth the earlier ideas were. Van't Hoff's discovery was due directly to De Vries' work on osmotic pressure in plant cells. He had shown that if cells are placed in aqueous solutions they take water from the solution if this be weak, but give up water to it if it be strong. With a certain concentration of the solution, equilibrium is obtained. De Vries found that solutions of cane sugar and of glycerol which contain the same number of molecules per litre are in equilibrium with the same cells; also that equimolecular solutions of KCl, NaCl, KNO<sub>3</sub>, and NaNO<sub>3</sub>, if three-fifths as concentrated as the corresponding solutions of cane sugar or glycerol, are also in equilibrium with the same cells. Van't Hoff explained and proved that these facts were due to the circumstance that there exists a perfect analogy between the osmotic pressure of a solution and the pressure of a gas containing the same number of molecules in the same volume. The deductions and developments which followed this discovery were many and far-reaching, but they were not found to cover all substances until the conception was made by Arrhenius that in solutions there is a division of salts and similar substances into ions. From this conception grew rapidly the theory of electrolytic dissociation, which calls now for consideration.

### III.

Electrolytic dissociation is based upon considerations of the progress of chemical processes or the passage of electricity through so-called salt solutions, be they of acids or bases. We have seen how Gay-Lussac, in his equipollency of salts in solution, had a glimmering of this in 1839, but to Alexander Williamson, my old teacher of chemistry at University College, London, is due the first serious theoretical conception of what is now considered to be in accord with fact. Williamson argued that in the formation of ethyl ether,  $C_2H_5OC_2H_5$ , in the presence of sulphuric acid, this latter is not consumed by the chemical process, but that in the first stage  $C_2H_5OH$  and  $H_2SO_4$  exchange radicals through double decomposition, so that  $HOH$  and  $C_2H_5HSO_4$  are formed. After

this, a second process takes place in which  $C_2H_5HSO_4$  and  $C_2H_5OH$  change radicals through double decomposition, so that ethyl ether and sulphuric acid are formed. The total change due to the two processes is therefore a formation of ethyl ether and water from two molecules of alcohol,  $C_2H_5OH$ . In the first process, the alcohol being decomposed into  $C_2H_5$  and  $OH$ ; in the second one, into  $C_2H_5O$  and  $H$ ; which is a fact. The quantity of sulphuric acid is unchanged, it seems only to bind the water formed during the process.

On this idea, Williamson generalized and taught that in a solution there is a perpetual change of radicals, or as we should now say, ions, between the molecules. In this way, the fact was explained that, in mixing two salts consisting of different ions or radicals, all the four possible salts were rapidly formed, just as Gay-Lussac maintained in his example. The same must be true also in respect of molecules of similar composition; thus, in a solution of  $HCl$ , an atom of hydrogen does not always remain bound to the same atom of chlorine but exchanges it for new chlorine atoms, one after the other. Similarly, if we mix a solution of  $Ag_2SO_4$  with one containing  $HCl$ , then a few molecules of  $H_2SO_4$  and  $AgCl$  are formed at once. The latter are but slightly soluble and precipitate, so that  $HCl$  and  $Ag_2SO_4$  are not formed again, but new molecules of  $H_2SO_4$  and  $AgCl$  appear in the solution, while the newly formed  $AgCl$  precipitates again. The process goes on until there remains only a sufficiency of  $AgCl$  just to saturate the solution in regard to it. We have here the counterpart of Gay-Lussac's theory of the equipollency of salts in solution.

In modern language we speak of the radicals as ions and the salts or acids and bases as electrolytes; but their changes go on as instantaneously as described in the above example. The velocity of their reaction is usually enormous, but with weak electrolytes they proceed more slowly. The ions of  $H$ ,  $NH_3$ ,  $K$  and most metals are charged positively with electricity, while such ions as  $Cl$ ,  $CN$ ,  $NO_3$ ,  $ClO_3$  are negatively charged. Suppose we place a solution of  $HCl$  in a vessel between two electrodes. The surface of the fluid will at once obtain a charge, so that positive ions are driven to the negative electrode and negative ions to the positive one. The different molecules will be turned round until they stand with the chlorine ion to the positive pole and the hydrogen ion to the negative. Both carry their electric charges with them, and the whole process is nothing but a transporting of positive electricity in one direction and of negative electricity in the opposite direction.



These facts constitute the basis on which Arrhenius formulated the theory of dissociation of electrolytes; that theory is the modern explanation of the conditions and reactions existing in solutions.

The splitting of molecules into particles or ions which, since they carry electric charges are electrolytes, involves an infinite number of chemical and physical interactions between the dissociated bodies existing in the solution. These interactions are balanced actions. Suppose we dissolve in water some common salt, potassium bromide, and lithium iodide. More than half the molecules of each of the three salts will dissociate into six ions of Na, K, Li, Cl, Br, and I. The first three are charged positively, and the last three negatively charged. All will be combining constantly to form molecules, and these molecules dissociating constantly again to set free ions. At the same time there is nothing to prevent the union of sodium ions with bromine ions, or of any other pair of positive or negative ions. The result follows that the solution contains not only the three original salts and the six varieties of ions, but also the new molecules of sodium bromide, sodium iodide, potassium chloride, potassium iodide, lithium chloride, and lithium bromide. The nine varieties of molecules and the six kinds of ions are therefore concerned in a complicated series of chemical reactions, the state of equilibrium being dependent upon known conditions. Thus, if the solution be a dilute one and the original substance present in chemically equivalent quantities, about 90 per cent of the materials will be ionized, each variety of ions being 15 per cent of the total; the rest or 10 per cent will be in the form of molecules, each variety contributing equal parts.

#### IV.

A plausible objection to the electrolytic dissociation theory for solutions is suggested by the fact that, if two substances are mixed with each other, they may be separated from each other by diffusion. This really has little weight, as it has never been observed that the ions into which a salt decomposes can be separated by diffusion. That they are not separated by diffusion is due to the fact that the ions of a salt, say NaCl, are charged with large amounts of electricity of opposite signs; the Na with positive and the Cl with negative electricity to the extent of 96550 coulombs per gramme equivalent. If the Na and Cl separated, the powerful electrical attractions between the atoms would carry the Na and Cl back to each other. The two ions appear therefore to move

together in equivalent quantities through the fluid as if no dissociation took place. Further, the diffusion of salts shows a certain parallelism with their electrical conductivity, and the rate of diffusion has been shown by Nernst to be equal to the driving osmotic pressure divided by the sum of the friction of the ions as determined by means of experiments on their conductivities. Another curious fact arises out of the study of diffusion. If hydrochloric acid diffuses in water its diffusion constant is approximately 2 at a given temperature; if, instead of water, a solution of common salt be used, the diffusion constant rises to 2.5 or even higher. This fact in no way weakens the validity of the electrolytic dissociation theory, as the explanation is that when the H ions, that is the acid, diffuse in pure water they drag the five times more immobile Cl ions with them in equivalent number. When Na ions are in the same fluid, these are carried back in the opposite direction to the diffusing hydrogen ions, because of the electric forces which held back the H and pull on the Cl ions in the direction of diffusion. The driving back of the Na ions neutralizes partly these electric forces, with the result that neither the H ions are less held back nor the Cl ions allowed to diffuse so readily as in pure water. Therefore, the H ions diffuse more rapidly in a ratio according as to how much the Na ions are relatively more numerous than the H ions.

No matter how we regard it, there is little doubt that the electrolytic dissociation theory goes far, if not the whole way, towards a right comprehension of the nature and action of solutions. Of the nature of the solutions commonly called colloids an explanation was given in the earlier article. In ordinary solutions the act of ionization depends really upon the dielectric or dissociation constant of the solvent, and the greater the dielectric capacity of the solvent the greater is the degree of electrolytic dissociation of substances dissolved in it when the conditions are the same. The following consideration may make this statement clearer. The positively and negatively charged ions naturally unite to form electrically neutral molecules because of the electrostatic attraction which exists between them; but this result is impeded by the action of another and opposing force, the nature of which is as yet unknown. The equilibrium between these two forces gives rise to the equilibrium between the ions and the undissociated molecules, or determines the degree of dissociation. When the dielectric constant is increased the electrostatic attraction between the ions is alone weakened, and hence the degree of dissociation is increased.

Of all solvents the dielectric constant of water is the highest. In other solvents than water, ionization or electrolytic dissociation is more complex. Some aspects of this are considered in the next section. Even so, there is no question but that the simpler equilibria between acids and bases and salts, through electrolytic dissociation or ionization are of extreme importance in all physiological processes; they lie at the base of the structure of all the more complex organic structures and have indirectly resulted in therapeutic advances by the development of ionic medication. In a word, the ions enhance the variety of chemical substances and of chemical reactions; they constitute a group of singularly mobile chemical agents, and provide or convey electricity. The best and most prolific source of such active ions is an aqueous solution.

## V.

The question of equilibria in solutions is complex and difficult to explain in a popular or non-mathematical article. The simplest chemical equilibrium is that between a gas and its solution in a fluid and, by the law of Henry, is expressible by saying that at a given temperature the concentration of the dissolved gas in the fluid stands in a constant ratio to that of the gas in the gaseous state. A similar law, commonly called the "partition law," is suitable as a general statement for the partition of a dissolved substance between two liquid phases; it may be expressed as, that for the same kind of molecules the co-efficient is equal to the quotient between the solubility of the substance in the respective solvents. This, however, is of very limited applicability, as equilibrium is disturbed by temperature, concentration, molecular weight, friction between ions, and the presence of foreign ions. The dissociation constant has been determined for a variety of salts under varied conditions. Limited as it is, the law of partition has been used to determine the molecular weight of substances in solid solution. For instance, thiophene is soluble in both solid and liquid benzene; since the partition co-efficient in both is independent of concentration, the inference is drawn that the molecular weight is the same in both cases. In another case, as in the partition of ethyl ether between water and solid naphthalene, it was found that molecules of ether in the naphthalene were of double magnitude. Arrhenius has applied the same law to the study of the distribution of substances between bacteria or blood corpuscles and their surrounding solution. In this manner, he has found that ammonia or acetic acid or saponin



possess the same molecular weight in water and in red corpuscles. It is difficult to say whether the reagents are united with some substance in the blood-cells, but it was determined that in every molecule of the compound just as much of the reagent is present as in one molecule of it in the surrounding solution. That the reagents are bound to some substance in the blood corpuscles is probable, because their concentration in the cell is some six hundred times greater than in the liquid in which it is suspended. The same is true for the absorption of agglutinins by bacteria or of the immune body by the red corpuscles. In these two cases, specificity plays a big part. This specificity can only be understood on the assumption of a chemical reaction between the cell content and the reagent. In these examples, the compounds formed contained only two-thirds as much of the reagent as a molecule of it in the surrounding liquid.

Perhaps the most important of all equilibria in solutions is that proved by Ostwald for weak acids, such as acetic, tartaric, and citric acids. These acids are so weak that only one of the hydrogen ions is dissociated off from each molecule, or that the molecules from which two hydrogen ions are dissociated are so small in number that they may be neglected. Some of the weak acids, such as the amido-benzoic acids, act as acids towards bases or as bases towards acids; these are called amphoteric electrolytes. The simplest substance which is an amphoteric electrolyte is water; which dissociates into the hydrogen ion characteristic for acids and the hydroxyl ion characteristic for bases. Most of the amphoteric electrolytic substances are the amido acids, in which one hydrogen atom of an acid is replaced by the group  $\text{NH}_2$  or a pyridine residue or its like. Also some hydrates of the metals are amphoteric, such as those of lead, zinc, alumina, arsenic, tin, chromium, and others. In all of these, the dissociation constant or "k," as it is written in the formulæ, is very variable.

A disturbing influence on equilibria in solutions is the presence of foreign substances, such as salts and alcohol. A simple example is the action of a sulphate, like potassium sulphate, on sulphuric acid; in that case a part of the acid is bound and an acid sulphate formed. The influence of foreign ions on the degree of electrolytic dissociation is shown typically by what takes place when equivalent quantities of two acids and a base are mixed. The stronger acid takes the greater part of the base. In this case, the influence of the ions of the salts and of the stronger acid lessens the dissociation of weak acid enormously, whereas the dissociation of the strong

acid is undisturbed. The inference to be drawn from this is that the avidity of an acid is proportional to its degree of dissociation. Again, water is electrically dissociated to some extent; therefore, in all solutions it reacts with salts, hydrolyses them partially, and influences equilibrium. For salts of a strong acid or base with a weak acid or base, the degree of hydrolysis increases nearly proportionately to the square root of the dilution. For salts of weak acids with weak bases, provided the dilution is not very high, the degree of hydrolysis is practically independent of dilution. These considerations show sufficiently that the question of equilibria in solutions is complicated, and only comprehensible by the light of advanced physical methods of research.

An interesting feature of dissociation is the fact that in some examples it is accompanied by contraction. Typical cases of the kind are ice, which has a greater volume but probably more complex molecules than liquid water, and the contraction occurring on mixing ethyl alcohol with water. The explanation suggested by Drude and Nernst is that the free energy of a charged particle, such as an ion, is the less the greater the constant of dielectricity in its surroundings. The dielectric constant of water is high and increases with compression. Now the free energy tends to a minimum, therefore the water has a tendency to contract in the vicinity of the ions. This contraction is sometimes so great that the volume of the solution is less than that of the water contained in it. Another view is that the ions may bind water, and this binding might well cause a strong contraction. This idea of the ions binding water is highly interesting and may have a bearing on the relative electric conductivity of the ions. So far as one's reading goes, it would appear that the sodium ions are on the average bound to about one molecule of water. The other monovalent ions are bound to greater or less quantities of water, generally lying between zero and 2. With rising temperature, the number of water molecules bound to the ions dissociate off; they then approach the limit value, which is characteristic for ions without "ionic water." Therefore, the molecular conductivity of different monovalent ions converges towards a common value with rising temperature, and the bivalent ions converge to double this value. It is well known that a small particle moving in water carries with itself a water envelope; further, it is not difficult to conceive that the water molecules, with which the moving particle collides, are attracted to and carried with it. The number of water molecules dragged in this manner should and

do increase with the complexity of the ion and with the number of ionic water molecules. That only a very small number of water molecules is bound to the ions is evident from their marked individuality in moving through water, especially if we consider the influence of the temperature on the mobility. An inspection of some values given by Bredig regarding the conductivities of organic ions and consequently consisting of a great number of atoms, shows that their conductivities are roughly inversely proportional to the third root of the number of atoms in the molecule. This is in accord with theory. The experimental data indicate that the conductivity of the ions decreases with the increasing number of ionic water molecules, and the hydration of a dissolved substance increases with dilution. From these facts, we may conclude that the average number of ionic water molecules increases with dilution, and that any change in degree of dissociation, calculated from the conductivity, is influenced rather by the diminished mobility of the ions at high dilution than by the extent of actual dilution. The increase of ionic friction with dilution is therefore largely the effect of hydration and, in the case of strong electrolytes, is a disturbing factor of importance as effecting equilibrium in solutions.

## VI.

There remains now but to consider some arguments as to whether solution is a physical or a chemical process. As far back as the days of Prout and Berthollet, it was considered that the contraction or the heat effect usually observed when a substance is dissolved or its solution diluted, is a certain indication of a chemical process. From similar reasoning, it would be correct to suppose that corresponding phenomena observed when a liquid freezes is evidence that freezing is a chemical process. Present-day opinion holds the view that solidification is a physical process; on the other hand, we have to admit that this process is absolutely of the same nature as the conversion of one allotropic modification of a substance into another, as when monoclinic sulphur is converted into rhombic sulphur.

In attempting to decide what is a chemical and what is a physical process, it is safe to define the position by saying that in a physical process the molecules of the active substances undergo no change, while in a chemical there occurs a change of the molecular structure. In many cases the change is insignificant, and then the difficulty arises where to draw the line. A good instance of the kind is water. At 4° C. water shows a maximum density which is certainly due to

the presence in the water of two kinds of water-molecules, namely, the water-molecules proper and the ice-molecules, which are in chemical equilibrium. When the temperature falls this equilibrium is disturbed and some of the water-molecules proper are transformed into ice-molecules, whereby the volume increases just as we know happens when water freezes to ice. Of course, the structure of the ice-molecule is more complex than that of the water-molecule, and it is not unreasonable to argue that on cooling water below  $4^{\circ}\text{C}$ . we bring about a chemical process; but the properties of the water change so little in the whole of the process that it is equally not unreasonable to call it a physical process. In reality, it is a combination of both.

If we think critically over what does happen, we find that the ice-molecules and most of the water-molecules are unchanged when the temperature is reduced to between  $4^{\circ}\text{C}$ . and  $0^{\circ}\text{C}$ ., and that the molecules are subjected only to a physical process. It is true a very small number of the water-molecules are subject to a real chemical action, as they undergo a structural change on being transformed into ice-molecules; but that part of the whole process is relatively unimportant and almost negligible. It is, therefore, no wonder that the whole reaction is regarded as a physical one, in spite of some small chemical change occurring synchronously. On the other hand, we cannot get over the fact that the transformation of water into ice may be, and probably is, mainly a chemical process, because in the water at  $0^{\circ}\text{C}$ . the greater and overwhelming proportion of the molecules is of the water-molecule variety, and only very few ice-molecules occur. If we disregard the very unstable super-cooled water, the two modifications of water, namely, fluid water and ice, do not exist both together at any temperature except at  $0^{\circ}\text{C}$ . at ordinary pressure; and if an ice-crystal is brought into contact with the super-cooled water, the latter freezes very rapidly to ice with an elevation of the temperature to  $0^{\circ}\text{C}$ . Notwithstanding the circumstance that it is orthodoxy to say that the freezing of water is a physical process, the weight of evidence seems rather to point towards the view that the freezing of water should properly be regarded as in the main a chemical process.

Let us take another case, namely, that of acetic acid. According to the dissociation theory, at  $25^{\circ}\text{C}$ . in a 1 per cent solution of acetic acid, about 1 per cent of the molecules are decomposed into their two ions, or  $\text{CH}_3\text{COO}$  and  $\text{H}$ . If the solution be diluted to double its volume with water, the number of the dissociated molecules increases in the proportion of 1.5 to 1 at the expense of the

undissociated molecules. The remaining 98½ per cent of the original whole, consisting of undissociated molecules, continues unchanged, as a bare 0·4 per cent of them become split up into their ions on dilution. In this case the chief process is undoubtedly a physical one, in spite of the fact that 0·4 per cent of the acetic acid molecules do undergo a very important change of structure. Against this view is the fact that the whole process is associated with hydration, which is essentially a chemical change, as it involves the addition of water to the acetic acid molecule. It is obvious that we have here a situation parallel to that of water freezing into ice, and that the chemical act of the hydration of some 0·4 per cent of acetic acid molecules is of about the same degree of significance or insignificance as the transformation of water-molecules into ice-molecules. In reality there is no sharp limit between physical and chemical processes, and in attempting to decide whether solution is a chemical or a physical process, it is wiser to take the middle course and hold that solution is a complex, partaking of both.

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## THE WOUNDING EFFECTS OF THE TURKISH SHARP-POINTED BULLET.

BY MAJOR E. T. F. BIRRELL.

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THE published results of experiments on the wounding power of the sharp-pointed bullets recently adopted by certain nations have led to the general impression that wounds of a greater severity and resulting in a higher mortality than those caused by ogival-tipped bullets might be expected from their use in warfare. The experiences of the Balkan War, 1912-13, however, in which the Turks used a sharp-pointed bullet, do not altogether bear out these anticipations.

Fessler's experiments with the German "S" ammunition, at the Bavarian School of Musketry, which were conducted on human and animal cadavera at ranges of from 10 to 1,500 metres, showed that its sharp-pointed bullet, by having the centre of gravity near its base, is apt to turn over on its short axis when the point meets even a slight resistance, such as the chest wall, a portion of equipment, or even, at short ranges, the abdominal wall. Thereafter it passes through the tissues broadside-on, or turned completely round, base first, presenting a larger striking surface, but at the same time preserving a practically undiminished velocity, and therefore creating a more formidable wound. The condition of the track of the bullet through soft tissues and bone after turning, and the lacerations which it caused in abdominal organs even without turning, led to the belief that with such a projectile almost all wounds of the abdomen would prove fatal, and that wounds generally would be extensive and severe, necessitating, therefore, the provision of a proportion of specially large first field dressings, more ample measures for arresting hæmorrhage, and an increased supply of splints for the serious damage to bone which could be expected. Amputations, it was anticipated, would require to be more frequently performed than in wars in which the ogival-tipped bullet was used.

A further series of experiments with sharp-pointed bullets, fired at the carcasses of recently killed animals, referred to by Lieutenant-Colonel E. M. Pilcher, D.S.O., Professor of Military Surgery at the Royal Army Medical College, in a paper read before the

United Services Medical Society in 1911,<sup>1</sup> bore out generally the conclusions arrived at by Fessler. It was remarked that the bullets experimented with had a tendency to turn on their short axis at all ranges on meeting any considerable resistance, and especially when, after encountering a resistance, they passed through a space filled with soft unresisting tissues, such as the chest or abdomen. Large wounds with pulping of the flesh where the bullets passed out were common at ranges up to 500 yards, not only when bone was struck, but also when soft parts alone were traversed. Turning over of the bullets on their short axis was found in 63 per cent of all wounds caused in the experiments, and a change in the direction of the track, even in soft tissues, in 13 per cent.

Lieutenant-Colonel Pilcher's conclusions agreed in the main with those of Professor Fessler, with the exception that he did not anticipate any great enhancement of the severity of injury to bone. Although he considered the pointed bullet a more severe projectile than the round-nosed, small-bore bullet, he doubted if the contrast was really striking. He was inclined to compare the wounding effect of the newer pattern missile with those of the old leaden Snider or Martini bullets, which produced injuries, at any rate at short ranges, of more severe type than the modern bullet of the usual pattern. He recalled the fact that similar prognostications of increased severity were made when the small-bore, high-velocity, ogival bullet was first introduced; and he pointed out that experiments, however realistic, could not reproduce the varying possibilities of impact in actual warfare. The Japanese, moreover, in Manchuria had used a bullet which, if it did not readily turn over on impact, was, from its lightness and small calibre, inclined to be unstable and to "wobble" in its flight, and so strike broadside-on or nearly so; yet the wounds produced, although sometimes severe and extensive, were by no means invariably worse than those caused by other small-bore bullets.

Another factor on which the wound-producing power of a bullet depends is the behaviour of the envelope on impact. If this is soft enough to become deformed on meeting a resistance, such as a bone, or if it breaks up or "mushrooms," the striking surface in either event is increased and the wounding power thereby enhanced. In Fessler's experiments with the German ammunition the only sign of breaking up in eighty-seven bullets examined was the tip of one being lost, but he notes that after striking a hard bone the

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<sup>1</sup> JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, December, 1911.



point may be bent. In the experiments quoted by Lieutenant-Colonel Pilcher, deformation was not infrequent, the bullet from its composite character being deformed in 28 per cent, and broken up in 13 per cent. He referred to the fact that the Mauser bullets used by the Boers in the South African War frequently became misshapen on impact.

Although the bullet used in the Turkish Army may differ in points of detail from that adopted by the German Army, and from those used in the experiments quoted before the United Services Medical Society, it is of the sharp-pointed type, and as such its effects are worthy of consideration. It is a nickel-mantled bullet of 1·075 in. length, ·311 in. diameter, weighing 154 gr., and with a density of 334 gr. per square centimetre or 0·15500 square inch. The bullet is propelled by 45½ gr. of smokeless powder in flakes (Rottweil), and develops a muzzle velocity of 2,788·6 ft. per second and a muzzle energy of 2,661 ft. lb. The rifle (model 1893) is a Mauser, 7·65 mm. (·301 in.) calibre, with a vertical, detachable box magazine loaded by a charger carrying five rimless cartridges (model 1907 and 1908).

The two pointed bullets which were used in the experiments described by Lieutenant-Colonel Pilcher differ in length, calibre and weight from the Turkish bullet; the particulars of the two former being in one case, length 1·300 in., calibre ·312 in., weight 174 gr., and in the other, length 1·105 in., calibre ·323 in., weight 154·5 gr.

Although differing considerably in some particulars, the wounding effects, apparently, of each were practically identical, and it is the more remarkable that the wounding power of bullets of the same pointed type as seen in the Balkan War should have been slight in comparison to that of the bullets used in both series of experiments. It must be admitted, however, that observers have differed in their conclusions as to the effects of the Turkish bullet. Professor Fraenkel, of Vienna, in describing his experiences with the Bulgarians<sup>1</sup> characterized the wounds as generally much the same as now noted in recent campaigns. He found, however, that the pointed bullet showed a great tendency to rotate on its transverse axis during its course, and thus strike the man base first, some of the wounds so inflicted exhibiting extensive damage.

Regt. Arzt. Dr. F. Tintner,<sup>2</sup> from his experiences at Jamboli,

<sup>1</sup> *Wien. med. Wochenschr.*, No. 6, 1913.

<sup>2</sup> *Militärarzt*, March, 1913 (*JOURNAL OF THE ROYAL ARMY MEDICAL CORPS*, May, 1913).



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appears also to have found that the Turkish bullet sometimes rotated on its axis, as he remarks that on the whole the wounds inflicted were humane, except when the bullet struck broadside-on. He also notes that deformation of the bullet was rare, but instances two cases in which the mantle was split and separated from the core.

On the other hand, Dr. Grinberger, chief of the Swedish Red Cross Ambulance in Serbia, who seems to have had opportunities of examining both Servian and Turkish wounded, considered the injuries caused by the sharp-nosed Turkish bullet more favourable, on the whole, for speedy healing than those resulting from the blunt-nosed Servian bullet, although the latter is of smaller calibre. He thought the Turkish bullet the more "humane" of the two, and pointed out that the Servians—from a purely military point of view—gained an advantage by using a bullet which rendered their enemies more unfit for service, and for a longer period, than that to which they themselves were exposed.

The experiences of the British Red Cross Society's units with the Bulgarian Army bear out those of other observers as regards the general similarity of the wounds inflicted by the pointed bullet to those caused by other small-bore bullets, but do not serve to confirm the statements as to rotation of the missile on its short axis, or stripping of the envelope.

The hospital formed by the British expedition at Kirk Kelisse received Bulgarian wounded from the fighting which took place at Chatalja between November 16 and 18, 1912, the earliest being admitted on November 26. The number of wounded received was only 161, but all but one were septic, and the majority were severely injured. Many remained in the hospital all the time it was open, affording ample opportunity of studying the nature of the wounds. While most had been hit by small-arm bullets, a number had received shrapnel wounds, but the exact figures cannot be stated. In many instances, however, bullets were found lodged, and their examination *in situ* was rendered possible by the use of skiagraphy. In no case, where the pointed bullet remained in the track, did the examination or subsequent operation show that it had turned over on its short axis or been deflected.

In a few cases with septic wounds, it was observed that the bullet, after having been in the tissues for some weeks, and after the muscular planes had become opened up by the pus burrowing between them, was capable of travelling, by the action of gravity assisted by the movements of the patient, to a distance from its

original site, and then might be found lying loose and pointing in any direction. In one case of bullet wound of the leg, which had been X-rayed the day before operation, the bullet was found quite two inches below the spot marked, the man having got out of bed and walked about in the interval.

As a rule, the bullets appeared to have passed straight through soft parts and organs without deflection, turning, or "setting-up," doing very little damage; only two amputations were necessary. In a few cases, believed to have been hit at extreme range, the wounds of exit were of the "explosive" type. No splitting or stripping of the envelope was noted, and the only deformed bullet found lodged had obviously been a ricochet; the point was bent over, and just behind it was a flattened surface, deeply scored with scratches, such as could only have resulted from striking a rough, hard substance such as a stone.

From these observations one concluded that the Turkish sharp-pointed bullet caused injuries no more severe than would be expected from a small-bore, high-velocity bullet of the ordinary type.

The Bulgarians themselves frequently remarked that the Turkish bullet was very humane, and surprise was expressed at the few men killed in comparison to the number wounded. The statistics for wars for many years back show that on a pretty constant average four men are wounded for every one killed in battle. In the Crimean War, the British lost 1 killed to 4·4 wounded, and the French 1 to 4·8; in the Italian War of 1859, the French lost 1 killed to 7·7 wounded, the Sardinians 1 to 4·9, and the Austrians 1 to 4·8; in the New Zealand War the British lost 1 killed to 2·8 wounded; and in the Franco-German War, from July 24, 1870, to April 1, 1871, the whole German Army, South German included, lost 1 killed to 5·4 wounded.<sup>1</sup> In the Russo-Japanese War, the Japanese lost 1 killed to 3·4 wounded<sup>2</sup>; and in the South African War our figures were 1 killed to 3·6 wounded.

Bearing the normal proportion in mind, and having regard to the impressions gained by observers on the spot, it is difficult to accept the figures published in May last and said to be official<sup>3</sup> regarding the Bulgarian war losses, figures which show for the first Balkan campaign a proportion of 1 man killed to 1·76 wounded; or, including officers, 1 killed to 1·78 wounded (total officers

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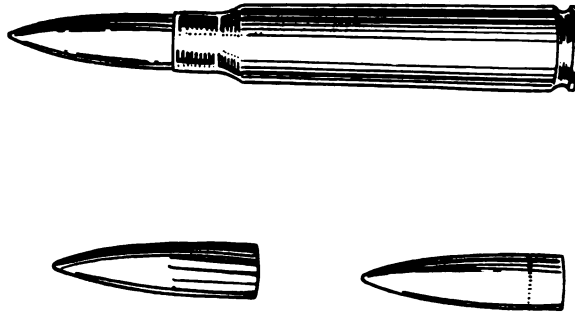
<sup>1</sup> These figures are from Sir Thomas Longmore's "Gunshot Wounds."

<sup>2</sup> Medical and Surgical Reports, Russo-Japanese War.

<sup>3</sup> *Morning Post*, May 2, 1913.

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killed 330, wounded 950; total non-commissioned officers and men killed 29,711, wounded 52,550). The casualties at the storming of Adrianople, published at the same time, appear more in keeping with the general opinion formed of the Turkish bullet's effects. The Bulgarian losses, including officers, work out at 1 killed to 5.1 wounded; and the Servian (with a much smaller force) at 1 killed



to 4.2 wounded. (Bulgarians: killed, officers 24, soldiers 1,274; wounded, officers 82, soldiers 6,573. Servians: killed, officers 6, soldiers 268; wounded, officers 7, soldiers 1,166.)

The illustration shows a Turkish cartridge and two bullets (exact size), one unfired, the other a bullet which was extracted from a flesh wound received at Chatalja.

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# DAIRIES AND COWSHEDS: THEIR EFFECT UPON THE PURITY OF THE MILK SUPPLIED TO MILITARY HOSPITALS, TROOPS, AND MARRIED FAMILIES.

BY QUARTERMASTER-SERJEANT E. B. DEWBERRY.

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## PART II.

IN the first part of this article the relation of the sanitary state of cowsheds and dairies to a pure milk supply was considered, and it is now proposed to submit a few more remarks on the same subject, but dealing more particularly with the cattle themselves.

Where large quantities of milk of good quality are required to supply military hospitals, troops, and married families, it is essential that only first-class breeds of dairy cattle be kept.

The upkeep of a herd of such cattle yielding large quantities of good milk does not in the long run cost much, if any, more than a herd consisting of poor breeds producing only small quantities of inferior quality; while the profits arising from the sale of the milk in the first case more than compensate for the extra capital outlay incurred in purchasing the cows.

It is generally advisable to keep, in addition, a certain number of cows which are capable of breeding a good type of calf, and which, having had their day as milch cows, can be fattened to produce a good quality cow-beef.

The undermentioned breeds are generally considered to be specially suitable for dairy purposes: Dairy shorthorns, South Devons, Kerries, Ayrshires, red-polled cattle, Welsh cattle, Jerseys, Lincoln reds, and Guernseys.

There is no better breed of cow for milk production than the average non-pedigree shorthorn, first-class animals in full milk having been known to yield as much as 800 gallons per annum. Such animals cost from £20 to £25. Owing, however, to the fact that the milk given by these animals does not contain a high percentage of fat, dairymen frequently keep in addition Jersey and Guernsey cows, which yield milk of a very high quality containing from 4 to 5 per cent of fat. By mixing the two grades of milk, the quality is kept up above the minimum standard of the Board of Agriculture, viz., fats, 3 per cent, and solids-not-fats, 8·5 per cent.

## COWS IN HEALTH AND ILL-HEALTH.

It is most useful when carrying out the ordinary routine inspection of dairy cattle to be able to tell at a glance whether the animals being milked are in good health, or whether they are suffering from any disease; and it may therefore be of interest if some of the signs are indicated by which the condition of the animals can be ascertained.

A healthy animal is quiet and docile; it moves easily, and appears contented and well nourished. Its coat is never rough or staring, but is always glossy and in good condition. The skin is mellow, supple, rather loose, and oily to the touch. The flesh is generally firm and elastic, but it must be remembered that cows that are heavy milkers are frequently thin and bony. The eyes are bright and the nasal mucous membrane red, moist, and free from sores or discharge of any kind. The muzzle is cool and the tongue moist, warm, and clean. The normal temperature ranges from  $101.5^{\circ}$  to  $102^{\circ}$  F. The animal breathes noiselessly and regularly, and the breath has no disagreeable smell or odour of physic. The animal, if lying down, is able to rise without difficulty, and after rising stretches herself. She is free from lameness. There are no signs of diarrhoea, and the stools are not watery or hard, nor the urine bloody. No outward symptoms of skin disease are seen on any part of the body, and the teats are not hot to the touch. The udder before milking is full and capacious, with the milk veins large, prominent, and branched, and is soft but not flabby.

*Ill-health.*—The animal usually appears miserable, and has a distressed appearance. Its movements are heavy and sluggish, respiration is difficult, and the eyes dull and hollow looking. The muzzle is hot and dry, or covered with foam, and there is heat at the base of the horns. The animal has a staring coat and tight skin (hide-bound). A cow may be looked upon with suspicion when it does not “chew the cud” for any length of time, when it stands apart from the remainder of the herd or cowers behind a wall.

## TUBERCULOSIS IN CATTLE, ITS SYMPTOMS, AND SOME MEASURES TO BE ADOPTED FOR ITS PREVENTION.

In Part I of this article a short note was given on the new Tuberculosis Order of 1913. Tuberculosis is one of the most important and most prevalent diseases of dairy cattle; probably 25 per cent of indoor cattle are affected. The prevalence of the disease is indicated by the fact that in October last 602 infected premises were notified to the Board of Agriculture, 655 animals



being affected. In September the number of infected premises was 529, and in August 428—the animals affected being 578 and 465 respectively.

Again, during the period between July 1, 1908, and March 31, 1913, the London County Council inspectors examined 12,548 samples of milk, 1,243 (or 9·9 per cent) proving tuberculous. During the same period, 2,298 visits were made by the inspectors to farms outside the County of London, and 63,159 cows examined. The examination showed that 656 (or 1·9 per cent) were affected with tuberculosis of the udder.

As it is absolutely essential for food animals to be free from the disease, it is obviously necessary for those whose duties include the inspection of dairy cattle to know the chief symptoms by which tuberculosis can be recognized in all its stages.

The infection is usually conveyed from one animal to another by means of the expectorate containing the tubercle bacillus; in fact, the inhalation of air laden with tubercle bacilli is the most common way in which the disease spreads. Infection by ingestion is, however, not uncommon. The bacilli, having gained entrance to the body by either of these two means, obtain a foothold in one or more organs, and, rapidly multiplying, cause alterations in the cells and subsequent destruction of the tissue. In this way the characteristic nodules or tubercles are formed.

*Symptoms.*—In the early stages of the disease, the symptoms are often not very distinct, and in the majority of cases the animals appear in good health. As a rule, there are no symptoms that would lead one to suppose that the cow is suffering from the disease; but those in constant attendance upon the animal would notice that at times she appeared to be out of sorts, had a disinclination for food, and suffered from a hollow, weak, short, irritable cough in the early morning. The last-named symptom would be especially marked if the lungs were the seat of the malady. As the disease advances the symptoms become more pronounced, viz., there is loss of appetite, the coat becomes dull, dry and staring, the hide tight, and the cough more frequent. The eyes have a glassy appearance and seem to sink into the sockets, the muzzle is dry, and the breathing is difficult and panting. Sometimes there is a discharge from the nostrils, and, where there are abdominal lesions, intermittent diarrhoea and emaciation. The temperature rises to 104° or 105° F.

If the chest of an animal in this stage of the disease is tapped with the fingers there will be found patches over the region of the

lungs which have no resonance, but sound dull and solid. There may, in addition, be localized signs of the presence of the malady, such as an enlargement of the glands of the neck, enlarged, thickened, painless joints, accompanied by hard, enlarged adjacent lymph glands.

A most important seat of the disease is the udder, on account of the discharge of the tubercle bacilli with the milk, but the udder does not usually become affected until the cow is in a fairly advanced stage of the disease. The posterior quarters of the udder are, as a rule, the first to be affected, and tuberculosis may manifest itself in one or both of these quarters. Hard, nodular, painless swellings can be felt in the udder; these swellings are small at first, but they slowly and gradually enlarge and run together until the whole quarter becomes a diseased mass. Sometimes the swelling is somewhat irregular, in many cases, it is diffuse and very hard, one or more quarters being completely indurated. This is due to the excessive growth of fibrous tissue, the gland tissue proper being destroyed. A tuberculous udder is apt to be confused with one affected with ordinary mammitis or garget. It differs, however, in that in the former case there is little or no pain on pressure, and in that the swellings gradually increase. In the early stages of tuberculosis in milch cows the milk remains normal, but as the disease advances and the quarters are involved, it becomes watery, thin, and bluish in colour; later, it decreases in amount and becomes flaked. As the milk from the affected udder may contain tubercle bacilli, diagnosis of the disease can be made by means of a microscopic examination of the milk.

Animals affected with tuberculosis may have diarrhoea, and excrete virulent material both from the bowels and lungs; and if the uterus is affected there is often an infective discharge from the external genital organs. The necessity, therefore, at once arises not only for the disinfection of all cowsheds, but also for their frequent and thorough cleansing. In this connexion it is important to remember that, as a general rule, the advanced cases, commonly termed "piners," or "wasters," provide by far the largest amount of virulent material.

In well-regulated dairy farms it is now the custom to subject to the tuberculin test all animals suspected of having tuberculosis. The tuberculin is injected under the skin of the suspected animal, and if the disease is present a definite reaction results, the temperature of the body rising. If, however, tuberculosis is not present, no marked effect follows. The animals that react to the test are

isolated, segregated, and destroyed under the Tuberculosis Order of 1913. Although the destruction of a cow seems to be a dead loss, it must not be forgotten that apart from the fact that its destruction prevents the spread of the disease, the cow herself would probably soon become useless, or at any rate unprofitable.

Although there is no doubt that the more cows are herded together indoors, in insanitary buildings and surroundings, the more tuberculosis is likely to flourish and spread, yet sanitary conditions and good ventilation are not in themselves sufficient to get rid of the disease. The source of the infection must be



removed. The danger of allowing a calf to suck a cow having the disease, or even one with a suspicious udder, is obvious, for the calf may contract the disease, and in its turn become a source of infection. Milk from a cow suspected of having tuberculosis must in no circumstances be used, either for animal or human consumption.

#### CLEANLINESS IN THE DAIRY AND COWSHED.

The chief sources of the contamination of a milk supply are dust, dirt, and germ-laden air in the cowshed; dirty utensils; impure water supply; improper food; and last, but not least, want



of cleanliness on the part of those employed in attendance on the animals. Moreover, the cow herself may prove a fruitful source of contamination on account of the germs which may exist on the hair covering the body, which may get into the milk.

Milk is a natural perfect food, having in the right proportions all the elements necessary to support life. As soon as it leaves the udder of the cow it becomes subjected to a process of gradual change. This change, which is fermentative in character, due to the presence of certain micro-organisms, continues until the milk becomes sour. The rate at which the change proceeds can, however, be kept under control to a large extent by the exercise of all necessary precautions in order to secure perfect cleanliness.

#### A TYPICAL COWSHED IN HAMPSHIRE.

The photograph on page 289 shows that the cowshed consists of a converted barn. There are no actual partitions between the cows, the whole shed being practically open all the way down; wooden standards are, however, fixed at the side of each cow's head, the standards being 3 ft. 6 in. apart. This cowshed accommodates forty-seven cows, from which a daily average of 141 gallons of milk is obtained.

Dairies and cowsheds are, unfortunately, often deficient in space, and the atmosphere consequently is impure, and frequently contains bacteria and is a source of contamination.

Every effort should therefore be made to keep the cowshed sweet and clean, by frequent cleansing and by the admission of as much fresh air and sunlight as possible. Owing to the faulty construction of some cowsheds the animals frequently get into a dirty condition, and their bodies become more or less covered with dirt and dust of all descriptions in which micro-organisms multiply with extreme rapidity. If the cowshed is not constructed on a model plan, it often happens that the space between the partitions is too long, and if the mangers are too high, the cows when they lie down have to draw back and lie in the manure, with the result that their udders become soiled with filth. The shed should be constructed in such a manner as to permit the animals to lie down with their heads over the mangers, and the spaces should be of such a length as to allow the excrement to fall direct into the manure channel, which should always be kept clean.

The walls of the cowshed should be occasionally swept down in order to remove adhering dust and dirt.

Every cow should be kept well groomed, but the cleaning and brushing should never take place at a time when milking is actually in progress, nor even immediately before. In the winter, when the cows pass most of their time in the cowshed, they should be brushed down immediately after milking. The hair on the udders and hind-quarters of the cows can be clipped with the machine clipper; this should be done every autumn. The udder and flank of each cow should be rubbed over with a damp cloth before milking, but care should be taken to ensure that the udder is thoroughly dried in order to prevent chill. A sponge should not be used for this purpose, on account of its liability to absorb and retain germs and dirt. During the process of milking it is essential that everything in the cowshed should, as far as possible, be at rest. For instance, cows should not be allowed to eat hay or dusty fodder, neither should bedding be disturbed, for during both these operations germs are likely to be disseminated.

Cows should be fed and milked at regular intervals, otherwise they become uneasy and this may cause a considerable reduction in the amount of milk obtained; besides, cows which are left long without being milked get distended udders and may suffer considerable pain. Care should be taken that the animals are not milked when they are dripping with rain-water, as this is probably a frequent source of bacterial contamination.

Strict supervision is necessary over those employed, to see that the clothes they wear, when engaged in milking, are clean and made of some suitable washable material, a white washable smock and hat being the usual and best clothing. A supply of clean water, warm if possible, together with clean towels and soap should be at all times available in the cowshed or its immediate vicinity, so that the milkers can wash their hands and arms. This should be insisted upon after each cow has been milked. No articles of clothing other than those actually being worn should be allowed in the dairy or cowshed. It is a good plan during the process of milking to have the pails and other receptacles covered over loosely with clean muslin, in order to prevent some of the impurities in the air and other dirt from obtaining access to the milk.

As soon as the milk of each cow has been drawn, it should be at once passed through a strainer into a clean churn, which should be removed as soon as possible to the dairy. The strainer usually consists of a shallow, bottomless pan, over which a piece of clean muslin is stretched by means of a metal ring. The muslin

can be easily removed and should be kept scrupulously clean, as otherwise an unpleasant flavour may be imparted to the milk. Straining should always take place before cooling, and should be done in a clean atmosphere. The milk is then cooled usually to a temperature of 50° F. Before and after use the cooler should be rinsed through with boiling water. Further, it should be frequently examined to see that there is no possible leakage of water into the milk.

It is customary to milk cows twice in the twenty-four hours, and the more equally this time is divided up, the more uniform will be the quality of the milk. It must be admitted that in many cases it is difficult to equalize the time of milking, especially where the milk is supplied to military hospitals and troops, as the delivery of the milk is required at about 7 a.m. for breakfast, and 3.30 p.m. for tea. To meet the case, the usual times of milking are 6 a.m., and 2 p.m. This results in intervals of sixteen and eight hours respectively, and it often happens that the morning's milk is therefore the poorer in quality. This argument is frequently put forward as a defence in cases where vendors have been prosecuted for selling milk of a standard below the minimum of the Board of Agriculture.

#### WATER SUPPLY.

As already pointed out, the provision of a water supply for all purposes cannot be given too much attention. Frequently cows are watered at a stagnant pond, into which they have to wade in order to get to a sufficient depth to drink comfortably. While they are in the water, excreta may be dropped and germs carried on the animal's body to the cowshed. This is one of the many ways in which the bacterial life in a stagnant pond may gain access to the milk, and the farther a cowshed is kept from such a pond the better.

If a pond should be the only available source of water supply, it should be fenced in, and the water pumped into a suitable drinking trough. A running stream can be utilized for drinking purposes, or a trough through which the water of a stream passes. Rain-water can be stored in covered tanks and used for washing down cowsheds, but water from a main supply or a stream is preferable.

As mentioned in Part I of this article, no matter what may be the source of the supply, a sample of the water should be periodically taken and examined both chemically and bacteriologically.



## DAIRY UTENSILS.

All dairy utensils used for the reception of milk should be simple in construction. They should be without rims or crevices in which dirt might collect, and made of suitable material, with an impermeable tinned surface. No wooden vessels should be used on account of their absorbent nature. Many excellent types of milk utensils are now on the market.

All vessels should be cleansed immediately after use, first by washing them in cold and afterwards in hot water, using a stiff brush, but not a cloth, for the purpose; finally, they should be rinsed in plenty of boiling water. In up-to-date dairies a steam jet is used for the cleansing process. The utensils should be left to dry in a clean place, with the mouths or openings turned downwards.

Ordinarily, milk will keep in a good and wholesome condition for long periods, even in summer, provided it has been strained, cooled, and kept free from contamination. Preservatives are therefore quite unnecessary. It is not proposed to dwell upon the deleterious action on the human body of the various preservatives in common use, as it is generally recognized that the presence of such substances may have a harmful effect, especially on infants and invalids, who are more susceptible to their action than healthy adults.

Milk is commonly coloured with dyes, such as carrot juice, turmeric, annatto, &c., not only to give it a fictitious rich appearance, but also to cover any adulteration such as the abstraction of cream or the addition of skimmed milk. If a milk has a good natural colour, the latter will rise with the cream, but where artificial colouring matter has been added, the colouring remains to a large extent throughout the milk. The Departmental Committee on Preservatives and Colouring Matters were of opinion that the practice of adding colouring matters to milk was highly undesirable, and that, "the purchaser is entitled to be aware of the natural colour and to draw his own conclusions therefrom as to quality."

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## United Services Medical Society.

### ANTARCTIC EXPERIENCES.<sup>1</sup>

By SURGEON E. L. ATKINSON, R.N.

#### SNOW-BLINDNESS.

THE following observations refer to periods from November to January in each year. During this time the sun is at its maximum altitude, and the light at its brightest. Where a party is on land with black rock, the relief is marked. Most of the observations refer to the dead white plain of the Barrier. For the physical part of these, I am indebted to Mr. C. S. Wright, M.A. (Tor.) who was the physicist to the Expedition.

Snow-blindness may arise under three conditions of light:—

- (a) On bright days the effect is due to actual strong illumination.
- (b) Overcast days with strong illumination, but no contrast : On these days the light is exceedingly strong, but diffused.
- (c) Dull, overcast days with slow light. Contrast is here also wanting.

On dull, overcast days the light varied from 4 to 20; the illumination in a studio is from 10 to 20. On bright days the altitude of the sun has a great deal to do with the intensity of the light, on account of the absorption by the atmosphere. The liability to snow-blindness on bright days is therefore more pronounced towards noon. Up to the present, and until further observations can be made, there is nothing very definite known as to the quality of the rays causing snow-blindness.

*Snow-blindness on Bright Days.*—If one did not wear glasses, even for so short a time as half an hour, on those bright days, one was practically certain to have an attack of snow-blindness. The eye felt perfectly well while at work in the open, but the initial symptom was always noticed upon entering a tent where a Primus stove was alight. The attack began with a feeling of grains of sand in the eye. There was marked spasm, conjunctivitis, and weeping. Photophobia was well marked. This lasted for a varying period, the eye being irritable for as long as two days, even with treatment. The conjunctiva was congested and swollen, and the condition one

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<sup>1</sup> Extracts from a lecture given at the Royal Naval Medical College, Greenwich.

of extreme discomfort. It was a pure conjunctivitis and due entirely to the strength of the illumination.

While away sledging, treatment of this condition was by means of lamellæ, composed of zinc sulphate  $\frac{1}{250}$ th of a grain and cocaine hydrochloride. A certain number of lamellæ of hemisine (adrenalin chloride) had been supplied. These when made up into a 1 in 2,000 solution proved to be of the greatest benefit in this form. Unluckily, the supply was small and the zinc sulphate lamellæ had generally to be used. When away sledging the tea leaves used to be saved after luncheon and, made into a rough poultice, were worn over the affected eye under the snow goggles. This always produced a greater degree of comfort and was beneficial.

*Snow-blindness on Overcast Days with Strong and Diffused Light.*—On these days there was want of contrast, and the diffusion of light was caused by refraction and reflection of light from the surfaces of minute ice crystals, which were continuously falling. The light therefore came from all directions equally. It was impossible to distinguish the difference between foreground and horizon. One's appreciation of whereabouts was practically limited to the skis on one's feet. Contrast was entirely absent because of want of shadow, and, as an instance, it was possible to be standing within arm's length of a snow cairn 9 ft. high, and for the cairn to be invisible. Eye-strain was continuous, the eye striving to make out whether the foot was being placed on an even surface. It was impossible to appreciate any inequalities, such as sastrugi. At the same time the illumination was intense. The result of these two conditions was to cause conjunctivitis plus diplopia from the tiring of the eye muscles. The diplopia was exceedingly marked, and lasted for some considerable time. It was impossible to accommodate for any object, and it was only on going into the tent or seeking any dark object near that the diplopia was realized.

*Snow-blindness on Dull Overcast Days.*—On such days the effect was entirely one of eye-strain. Although the eyeball was congested to a varying degree, the main effect was due to eye-strain, and diplopia was much more marked. The want of contrast was the same, but the intensity of illumination was absent.

The deductions from the above are that snow-blindness is in part eye-strain, and in part due to the actual effect of light.

It may be that snow-blindness caused by fast lights when snow crystals are falling is due to selective reflection of a violet band



at the surfaces of crystals. One case of peculiar snow-blindness may be quoted.

E. W. Nelson was working continuously without glasses at his igloo on the sea-ice from December 14, 8.30 p.m., to December 15, 10.30 p.m. It was a bright day with low drift and clouds, cirro-stratus and cumulo-stratus, meteorologically 9-10. He went to bed and got up on December 16 with slight fullness in his eyes, but no running or soreness. He worked at the window with a slide rule all day. He went to bed and woke up next morning with an exceedingly bad attack of snow-blindness, with lachrymation and conjunctivitis; diplopia was not marked.

#### PREVENTION OF SNOW-BLINDNESS.

The form of leather snow goggles taken by the expedition was the result of the previous experience of Dr. E. A. Wilson. The main defect was that the glass was carried too near to the eye; condensation was therefore a frequent and troublesome factor. A better form of goggle would be one carried with the glass at a greater distance from the eye, and with more ventilation. Strong light also must not be admitted from the sides, and metal must not come in contact with the features. The colours of the glasses provided were light to deep amber, light to deep green, red, blue, and purple. There is no doubt that the most suitable from every point of view were the amber glasses, and their effect upon the spectrum would lead one to support this conclusion. The red glasses, strictly speaking, ought to be the most suitable, except for the mental effect. I tried these glasses on the Barrier in the Relief Expedition of October and November, 1912. The amount of contrast they gave through the light being practically monochromatic was splendid, and I cannot say that they had any bad effect upon one's temperament. The most suitable glasses for contrast are those which cut out largely the blue and violet ends of the spectrum, and one noticed on dull days that men who had these were in comparative comfort. As an instance of this, Cherry Garrard was able to make out cairns on the way back when the others were quite unable to appreciate them at all, though he was myopic, and had continuously to wear tinted glasses and actually had worse sight than any of the first return party. On bright days on the Barrier it was essential that the glasses should be worn at all times. At first, when one was inexperienced, at camping time the glasses were liable to be taken off. On bright days the natural effect followed, and one suffered from an attack of snow-blindness.



The influence of the altitude of the sun was well exemplified on the Southern journey. Marching south over the Barrier had been carried on during the night-time, and for a good part of this period we were able to work without our glasses. At the foot of the Beardmore the routine was changed to day marching. Thinking that the conditions were the same, and leaving off our glasses as usual, the result was a sudden attack of snow-blindness, which came at the most awkward part of the whole march.

The first attack of snow-blindness always made one more subject to subsequent attacks. Men with prominent eyes were more subject than those with deep-set eyes. The colour of the pigment of the iris also had a marked effect, dark-eyed people being less subject than those with blue eyes.

#### FROST-BITE.

Frost-bite varied in degree from the loss of a superficial patch of skin to the loss of parts of limbs.

*Frost-bites of First Degree.*—In the open, it was quite a common and even laughable experience to see one's companion's nose or cheek with a patch of white upon it. He, at the time, was quite unconscious that anything was wrong. When warned, he removed the warm can from his mit and placed it upon the offending part. At the same time, if there was any wind, he would turn away from it. After a minute or so, with a slight tingling sensation, the circulation returned to the part, and in the course of a day or so there was a very small loss of quite superficial skin. Parts which had been attacked by frost-bite became necessarily more subject and also, luckily, gave warning. If a wind sprang up, one felt a sting like that of a bee, and knew immediately that the nose or cheek was attacked, and took measures to bring the circulation back.

*Frost-bites of Second Degree.*—Frost-bite of the second degree caused blisters, varying depths of substance being implicated. It was quite common after any cold sledging trip for one's fingers to be bulbous at the end. This was due to blisters of varying sizes, and was caused by exposure to cold, and also by handling cold metal objects, like the cooker and Primus. These blisters were of no importance, and on return they were pricked; after some time the skin was replaced and the fingers became normal again. If the deeper tissues were affected, bathing in boracic lotion and dressing with hazeline cream was found to be the best method



of treatment. Another effect of continually touching cold metal objects was that the fingers never quite reached the stage of blistering, but the skin became hard and thickened, so much so that one was unable to appreciate such an object as a match between the fingers. The hardened skin always peeled off after we had been back in the hut for a time.

*Frost-bites of Third Degree.*—This degree, besides causing blisters, caused actual loss of substance by gangrene. After exposure the onset of gangrene came on at a varying period. It was never immediate, and varied from a fortnight to three weeks. The blister contained an evil-smelling, sanguineous fluid, and beneath it was a dark fungating patch. A line of demarcation formed after a varying period, and then sloughing of the affected part followed. The best treatment was to empty and pare away the blisters, and to keep the parts in baths of boracic lotion, the best dressing being hazeline cream or boracic ointment.

Luckily, only one case of gangrene occurred during the whole expedition, and this being superficial did not cause any serious effect. The only treatment that the majority of frost-bites needed was the application of a warm hand to the affected part. The application of snow is probably of use in temperate climates, but where the snow is at the same temperature as the air it is impossible to do this. Also, the snow in the Antarctic is composed of hard sugary grains, and the effect of rubbing this upon the affected parts would probably be more serious than the frost-bite itself. It was always as well to be certain that one had no frost-bites before returning to the warm hut.

The effect of food upon the circulation was very well marked. After one had been under way pulling a sledge for four or five hours, if there was any wind, one started feeling cold, and then began to be frost-bitten. On camping and having something hot to drink the effect was immediate. One felt the heart begin to beat strongly and powerfully, and gradually a glow spread downwards into one's feet and generally over one's body. On cold days, when the temperature was below  $-40^{\circ}$  F., if the air were still one was not at all subject to frost-bite, but immediately a slight or strong breeze sprang up with a rise of temperature one's face became affected. The amount of evaporation on a windy day compared with that of a still day is about the proportion of five to one. After washing and removing fatty substances from the face one was more susceptible to frost-bite.



## CLOTHING.

Owing to the nature of the very hard work one had to do in man-hauling, the clothes supplied had to be made of woollen stuffs. No amount of woollen clothing alone, however, would keep one warm in the Antarctic, as the wind could always penetrate it. The outer cover, therefore, had to be made of a kind of Burberry material which was wind-proof. Only certain portions of the clothing need be described, as a knowledge of their defects and advantages may be useful to future expeditions. Ordinary clothing consisted of an undervest of exceedingly thick merino material supplied by the Lindsay Wolseley Company. The back of this vest was doubled, so that one had an extra protection when lying in the sleeping bag on the ground. The vest was about three times as thick as the ordinary material of a winter vest at home. Over this a woollen sweater was worn, and in cold weather a thick merino pyjama coat as well. Pants were made of the same thick merino material and were about three times as thick as those for use in temperate climes. Over the legs one wore continuously a pair of trousers made of wind-proof material, and strapped to the sledge was a rough smock made of the same substance. The head, ears, chin, and neck were covered by a woollen Balaclava cap. As the ears are especially vulnerable, the sides of the Balaclava were covered over by wind-proof material. For really cold sledging a "nose-nip" was also needed. This was sewn on the top of the Balaclava, and usually made of some soft fur, covered on the outside by windproof material. It was attached to two beackets on either side of the ear flaps. When not in use it was re-stowed under the Balaclava cap, between it and the head. This served the purpose of freeing it from ice and keeping it soft and usable.

Socks and mits were perhaps the most important items of the kit. The best socks were grey, hand-knitted socks, supplied by the Lindsay Wolseley Company. Two pairs of them were usually worn, and in addition a thick outer pair of good hair socks made in Norway. The socks made by the Lindsay Wolseley Company had the following advantages: they were strong and reliable, and one might almost say never wore out. At the same time they were of loose texture, and when the perspiration from the feet had frozen upon them they would dry quickly on hanging them out for the night. The goat-hair socks would also dry quickly, but they were extremely thick, and sometimes it was almost impossible to put on one's feet socks that were as hard as a board. It was essential each night on camping to change the footgear immediately, the

socks having become saturated with perspiration. Special socks of very thick woollen texture were kept for sleeping in, and these remained practically dry. Over them was worn a loose fitting bag of some fur. On changing the socks they were pinned together with a safety pin and hung outside on a line stretched between two ski sticks. If there was a good sun, by next morning they were completely dry and comfortable. Over the socks one wore Finneskoe, or Finn shoes. These were made from the better parts of reindeer hide. It was essential to see that the Finneskoe were dry. As soon as camp was reached they were removed and allowed to freeze roughly into the form of the foot. They were then hung outside and allowed to dry as much as possible. The life of Finneskoe depended almost entirely on the amount of care one took to brush them clear of snow before entering the tent. Minute particles of moisture would be sure to cause loss of their hair and in consequence a loss also of their properties of preserving warmth. To keep the Finneskoe well in place, it was advisable to wear putties bound round their tops and over the wind-proof trousers. During cold weather, with the temperature below  $-30^{\circ}\text{F.}$ , there was always an accumulation of frost and ice between the pants and the outer covering. This one shook out at the end of the march. If the putties were worn high, for instance, up to the knee, the accumulation occurred there and was extremely uncomfortable: it was better, therefore, to confine the putties to the lower half of the leg.

The mits need more care in selection than any other kind of garment. The following were found to be of the greatest general use for summer and winter work: A pair of half-mits of fairly thick woollen material, extending well up the arm, and pinned in that position to prevent their falling down. They reached half-way up the fingers, and the thumb was in a separate compartment. Over these were worn a pair of very light woollen mits; the compartment for the fingers was single, and there was a separate one for the thumb. The mits were cut short, so that they only extended to the junction of the wrist with the hand, ensuring that even when they were frozen the hand could be easily slipped into them. Mits with a prolonged wrist were impossible to get into when they were frozen. It was also possible through their light nature to dry them quickly, and to handle the cooker with them on. Under summer conditions these were sufficient, but ordinarily one wore as well a pair of fur mits over all. In these again the thumb was separate and the fingers in a separate compartment. They were suspended

from the neck by means of lamp-wick, so as always to be ready in case of need.

A wind helmet was also worn and was best sewn on to the back of the wind-proof smock. It had a rounded funnel, stiffened in the outer part by wire, so that it could be roughly shaped and trimmed to the wind. The remainder of the helmet consisted of wind-proof material, with a long neck, so that the valance could be tucked within the neck-piece of the smock. These helmets were uncomfortable, and when worn in cold weather were difficult to take on and off. The breath and perspiration froze within them, and made their consistence extremely hard.

#### THE VENTILATION, SANITATION, AND WARMING OF THE HUT.

The hut was a building 50 ft. by about 25 ft. It was placed upon a level piece of ground without any pedestals. The walls consisted of several sheathings, and in the intervening spaces dry, non-inflammable seaweed was placed. The roof was covered with a substance known as rubberoid.

The warming of the hut was by means of the galley, which was kept continuously alight day and night. During the colder part of the winter it was found necessary to light a stove placed at the other end of the hut. From the galley and from this stove to the central part of the roof ran a long funnel inside the hut, connecting with an upright funnel outside.

For the first year ventilation was secured by means of an upright funnel running through the central part of the roof; the pure air was drawn into the hut through the doors. This ventilation was found to be insufficient during the second year; a hole was dug beneath the hut and an upright tube with a slide valve was fixed through a hole in the floor. Instead of being dependent on the doors alone, a fine stream of pure air now came in through this tube. When the ventilation had become too much the slide valve was closed down. It had the defect that the air coming into the hut immediately condensed. The temperature of the hut during the time of its habitation varied thirteen to fifteen degrees, the normal range being from 32° F. in the morning to about 50° F. during the day. Along the beams of the hut roof were long bamboos, and these served for the drying of clothes and gear.

Sanitation was provided by an outside w.c., and micturition was limited to a place near the tide crack, which was marked off by four rough posts. Sanitation is not a difficult matter in these

climes, as everything freezes almost instantly, and becomes inoffensive and innocuous.

#### HEALTH OF THE PARTY DURING WINTER.

To maintain the health of a party under these conditions, it is essential that at least two hours of hard exercise be taken every day. This routine was followed throughout the two winters, and was only neglected during bad weather, when it was impossible to go out. Nearly every individual in the first year had to exercise his pony, and in the second year his mule. Other exercises were found by digging holes through the ice in order to catch fish. Walking, skiing, and outside work could generally be done, but were dependent on the weather. During the morning all hands were employed doing work upon gear, and generally preparing for the coming sledging season. After exercising their beasts in the afternoon, the remainder of the time was regarded as their own. There was an abundance of work for everybody, and the health of the expedition was invariably splendid. Every month a record of measurements and weights was kept. At the same time chest capacity and grip were taken.

Throughout the first winter observations were also taken of the alkalinity of the blood.

The following results were obtained:—

*May 15, 1911.*—Griffith Taylor, N/30; Cherry Garrard, N/40; Bowers, N/30; Captain Scott, N/50; Simpson, N/40; Grau, N/30; Crean, N/30; Debenham, N/30; Ponting, N/30; Oates, N/30; Wright, N/50; Meaves, N/40; Lieutenant Evans, N/40; Dr. Wilson, N/30; Evans, G. I., N/30; Kechane, N/40; Ford, N/40; Lashley, N/30; Atkinson, N/30; Nelson, N/40; Day, N/40; Hooper, N/40; Clissold, N/40; Anton, N/40; Dimitri, N/40.

*June 20, 1911.* *Cape Crozier Party.*—Dr. Wilson, N/30; Lieutenant Bowers, N/30; Cherry Garrard, N/30.

*August 3, 1911.*—Dr. Wilson, N/50; Lieutenant Bowers, N/50; Cherry Garrard, N/50.

*August 28, 1911.*—Anton, N/40; Taylor, N/40; Grau, N/40; Debenham, N/40; Atkinson, N/40; Kechane, N/40; Meaves, N/40; Day, N/40; Simpson, N/40; Evans, G. I., N/40; Ford, N/40; Lashley, N/40; Crean, N/40; Dr. Wilson, N/40; Ponting, N/40; Oates, N/40; Wright, N/40; Hooper, N/40; Cherry Garrard, N/40; Bowers, N/40; Captain Scott, N/40; Nelson, N/40; Lieutenant Evans, N/40; Clissold, N/40; Dimitri, N/40.



The alkalinity of the blood was determined by Sir Almroth Wright's method.

Immediately after landing we took the trouble to secure as much fresh food as we possibly could. This consisted of Skua gulls, Adelie penguins, and Weddel seals. The seals were skinned and their carcasses frozen, and kept for future use. The penguins and Skuas were skinned and gutted and a large cave was dug in a big ice drift, and the carcasses stowed within. Besides, we had brought in the ice chamber nearly 100 carcasses of sheep from New Zealand. As these were infected superficially with a fungus, it was thought advisable to use them only sparingly. At least two meals a day had seal meat in them, and we were only allowed mutton on Sundays as a treat. Seal flesh is an excellent anti-scorbutic. It is extremely rich in blood, freezes firmly, and in the sterile atmosphere cannot deteriorate. It is slightly distasteful to many people, especially if they have had to do the gutting of the seal, but when hungry we could all appreciate it and eat very large amounts. Penguin is good eating, but not economical because of the large proportion of bone.

The only case of scurvy that occurred was attributable to easily explainable causes. Lieutenant Evans was away from the hut for two months previous to starting on the Southern Journey. During this time he lived entirely on sledging provisions. He was dependent for his food on being able to get from time to time to the hut and from there obtain fresh supplies. As the weather was bad this was not always possible; he therefore started on the Southern Journey in a worse condition than the remainder of the party. There was never any sign of scurvy in any other person.

The fate of the Southern Party was due entirely to starvation and exposure. In their case there was no mention and no sign of scurvy at all. It is quite easy in these climes to prevent scurvy, as is shown in the case of Lieutenant Campbell, who, living under the worst conditions for the contraction of this disease, came through without any ill-effects.

#### NOTES ON EFFECT OF SLEDGING.

The following notes may be of interest with regard to the effects of sledging trips upon the individual:—

*The Effect of Concentrated Food after Man-hauling for more than Two Months.*—All parties noticed after being out for more than two months man-hauling that they got practically no satisfaction from

the concentrated food. One became exactly like a machine. With a certain quality of food it was possible to go on for a certain time and do a certain amount of work. With a little extra food a little more work could be done. With the ration that was provided, after a time one started feeding on one's tissues. Emaciation was extreme on the return from the Southern Journey, and the effects of cold were naturally much more severe in this state. Owing to the fatty nature of the food defæcation was extremely easy, and one reacted in this way immediately to any increase of food.

*The monotony of travelling over a dead white surface* on overcast days, when no horizon was visible, was extremely marked. It can only be likened to an intellectual starvation, and one became dependent upon various methods of whiling away the tedium of the march, even descending to counting the number of steps.

*The effect of a cold trip upon the constitution* was extremely well marked, though with nothing definite. In any trip extending up to a week, where the temperature was continuously below  $-40^{\circ}\text{F.}$ , the men returned in an extremely low state. During this time one never, while in the sleeping bag, got any conscious sleep, and once or twice there were well-marked cases of men sleeping while actually under way. This want of sleep caused a general lowering of the constitution, and lassitude after a cold sledging journey is a thing always to be remembered. After these cold trips the feet, which had been in continuous contact through the Finneskoe with the cold snow, became very much congested. This congestion lasted for some time after the return, and gradually wore off. I believe it was simply a compensating effect.

*The strong light* and also its reflection from the snow caused a deep browning of the skin. Members crossing the Barrier became very nearly the colour of negroes, and this was simply due to the effect of the strong light.

Men who returned from the Southern Journey were extremely weak in certain of their muscles. They could have pulled the sledge throughout a very long day, but whereas before leaving they could have lifted 100 lb. easily, on their return after three months there was some difficulty in lifting even 30 lb. Certain muscles became trained, and could go on almost automatically.

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## Clinical and other Notes.

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### DESCRIPTION OF A SLING FOR USE WITH THE WAR-DEPARTMENT PATTERN STRETCHER.

BY LIEUTENANT-COLONEL H. P. ELKINGTON.

*Royal Army Medical Corps.*

*Object.*—The sling was designed to facilitate the embarking and disembarking of helpless patients (on the W.D. pattern stretcher) from piers or forts into boats, or from boat to boat, where gangways are unsuitable owing to steepness of incline.

*Construction.*—It consists of an oblong piece of strong canvas 6 ft. 6 in. in length and 5 ft. 3 in. in breadth (which allows for a hem of 6 in. on each side), into which is sewn an ash spreader provided at the ends with metal staves through which the supporting wires pass.

The base portion of the sling is 22 in. broad and is pierced by four eyelet-holes to receive the runners of the stretcher. The remaining portions of the canvas serve as curtains to protect the patient. There is an extra piece of canvas at the head and foot which is attached to the sides by means of toggles and buttons when the sling is in use, thus enclosing the patient on all sides.

The suspending wires are of  $\frac{1}{2}$  in. (circumference) extra flexible wire sewn along the whole breadth of the canvas, and the two ends are spliced on to metal thimbles which play in a ring that takes the wear of the crane hook when the sling is lifted and lowered.

In order to counterbalance the difference in weight between the head and foot end of the patient, and to ensure the sling hanging horizontally when loaded, the wires at the head end from sling to ring are 3 ft. 9 in. in length and those from the foot end 4 ft. 6 in.

The sling is clearly marked head and foot, so that there can be no mistake in loading.

In order to provide extra security for the patient, two leather straps are attached to the canvas by securing bands. The length of the one passing over the chest is 5 ft. 7 in. and that over the legs 4 ft. 10 in.

When not in use the sling is rolled up and occupies but small space.

*Directions for Use.*—(1) The canvas is laid flat out on the ground.

(2) The stretcher (prepared as for loading wagons) is placed on it, the runners fitting into the eyelet-holes (care being taken that the head end of the stretcher corresponds with the head end of the sling).

(3) The straps are adjusted over the patient.

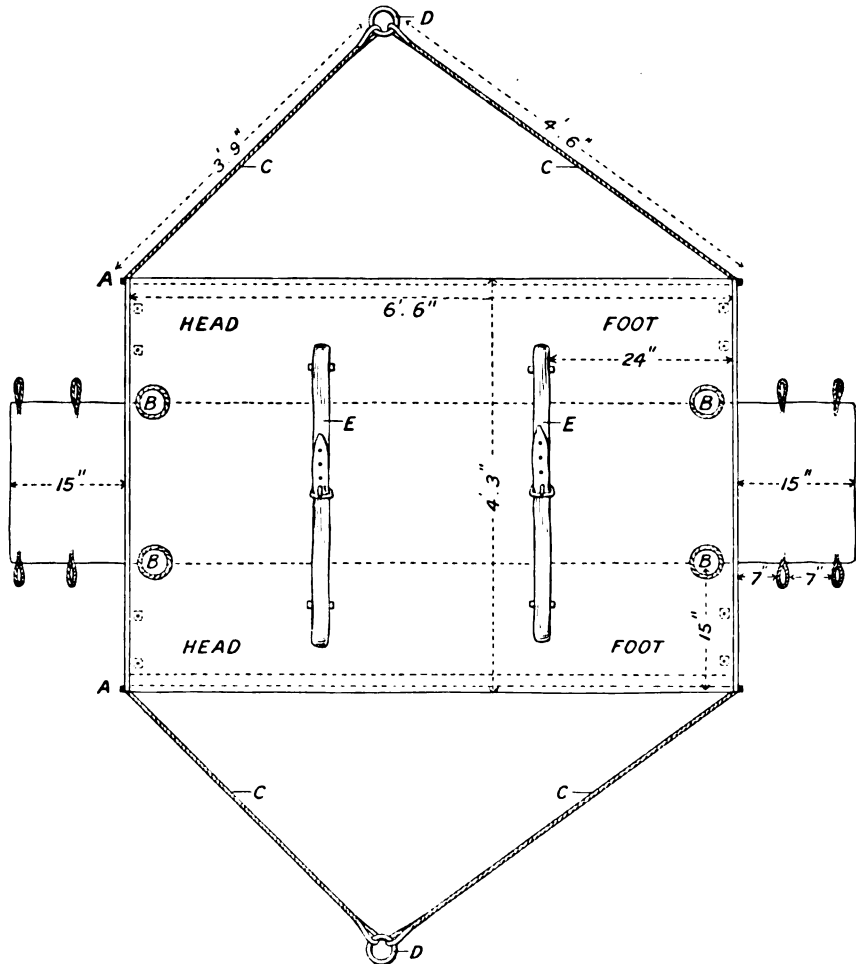
(4) The sides of the canvas are raised, the rings attached to the crane hook, the head and foot pieces of canvas are pulled up between the handles



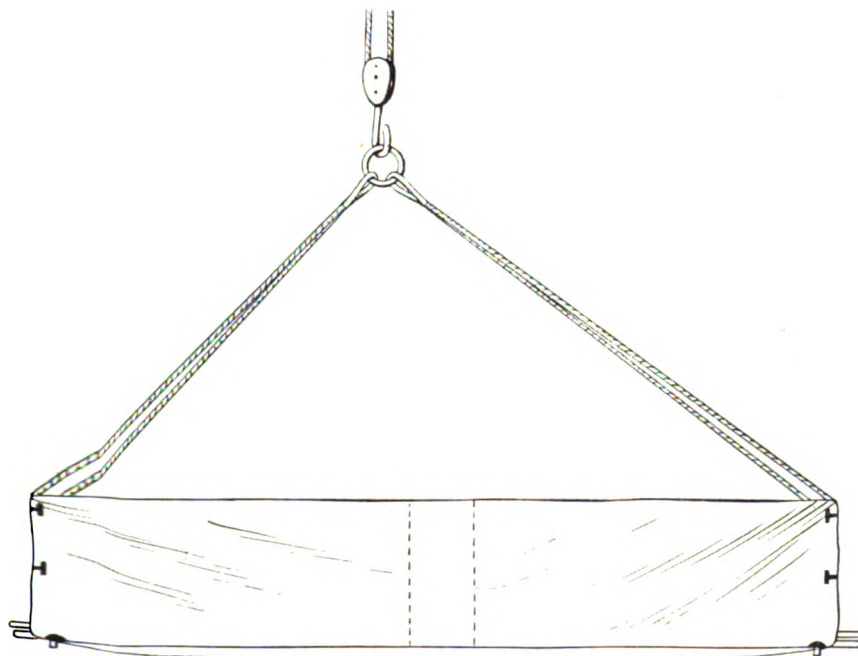
of the stretcher and fastened to the sides of the canvas by the toggles and buttons.

(5) The sling and stretcher are then lifted by the crane. In rough weather, and when the boat is rolling, it is advisable to attach guide ropes to the near-handle of the head and the off-handle of the foot end of the stretcher to assist in guiding the sling to its destination.

PLAN OF SLING FOR USE WITH WAR DEPARTMENT PATTERN STRETCHER.



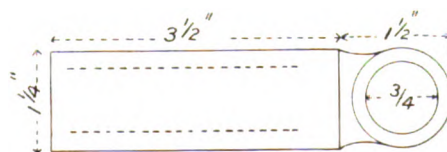
1.—A, Ash spreaders with gun-metal stave ends; B, eyelet-holes to receive runners of stretcher; C,  $\frac{1}{2}$ -in. (circ.) extra flexible wire; D, ring for attaching to crane hook; E, straps for securing patient and stretcher.



2.—Side view. Loaded and being lifted.



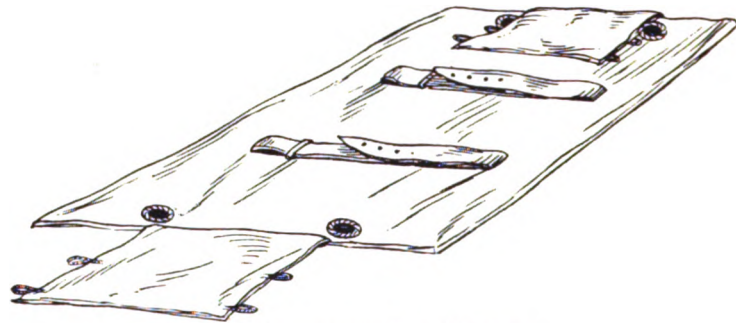
3.—End view.



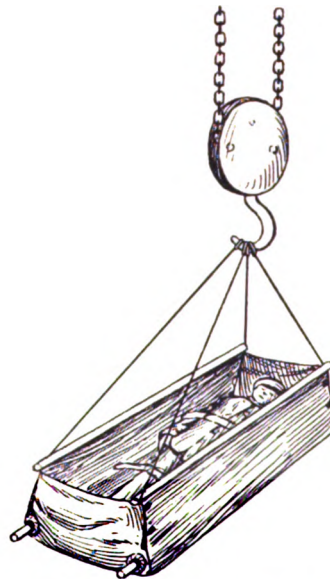
4.—Gun-metal stave ends for spreaders.

*Further Details.*—The drawings show :—

- (1) The sling laid out on the ground.
- (2) The sling in the air when loaded (side view).



5.—Sling on ground ready for use.



6.—Sling with patient on stretcher ready for lifting.

- (3) The sling in the air when loaded (end view).
- (4) The gun-metal staves at the end of the ash spreader.
- (5) The sling on the ground before use.
- (6) The sling ready for lifting.



The various measurements are as follows :—

*Canvas* : 6 ft. 6 in. in length by 5 ft. 5 in. in breadth (which allows for 6 in. on each side for a hem in which the spreaders are sewn).

Extra head and foot pieces 15 in. long by 21 in. broad.

The eyelet-holes are 15 in. from the outside and are  $3\frac{1}{2}$  in. in diameter.

With free head end from spreader to ring, 3 ft. 9 in.

With free foot end from spreader to ring, 4 ft. 6 in.

Supporting wire :  $\frac{1}{2}$  in. (circumference) sewn into sides of canvas.

Leather straps :  $1\frac{1}{2}$  in. broad. Length of strap for chest, 5 ft. 7 in.

Length of strap for foot end, 4 ft. 10 in.

The securing bands for these are 1 ft. from the side of the canvas and 24 in. from the ends.

The spreaders (of ash) are 6 ft. 6 in. long and  $1\frac{1}{4}$  in. in diameter.

#### AN INTERESTING CASE OF VERY LONG AGO.

By SURGEON MAJOR-GENERAL SIR A. F. BRADSHAW, K.C.B., K.H.P.

(Retired Pay.)

DURING the month of July, 1865, my battalion, the second of the Rifle Brigade, being then stationed at Meerut in the Bengal Presidency, the weather was intensely hot, also excessively close. Sunstroke began to assail the men to quite epidemic extent, and ephemeral fever became very prevalent at the same time, the sick list from both causes rising to 130 and 150 day after day. The stress upon the regimental medical staff and the hospital establishment was very severe indeed.

Among the patients brought to hospital was one in a remarkably unusual condition. He was young, well-built, and his symptoms were as follows: The whole body very red and so hot as to be actually stinging to the touch: never before (nor since) had I met with skin warmth so pungent; the eyes were deeply suffused with redness, and the agitated restlessness extreme; his consciousness, however, was not impaired.

It appeared to me that the man was in imminent danger of convulsions or apoplectic seizure, and that treatment without any delay was of urgent importance. Any external application intended as derivative from the head was negatived by the cutaneous hyperæmia, as any irritant might easily cause serious ulcerative inflammation; douching with the hardly cold water available did not promise certain advantage and possibly might increase the cerebral congestion (I had witnessed that effect in the affusion treatment of sunstroke); aconite or antimony I considered unsafe to give, and besides not quick enough in action for judicious employment.

Finally, I decided to try the effect of a mustard plaster placed in

the interior of the stomach, relying upon the intimate sympathy between the brain and that organ of digestion. Accordingly, I made the man drink a tumblerful of mustard and hot water mixed to almost creamy consistence, and followed it up with repeated copious draughts of hot water until he said he could not hold any more.

The result was nearly immediate; the man fell back on his bed and went off into a deep sleep, during which general perspiration oozed so profusely as to resemble the squeezing of a soaked sponge. Next morning he awoke feeling well and without any discomfort from the free dosing with mustard.

I did not know what to call the case. It was not an example of heatstroke, as there was not any degree of insensibility; nor was it one of exaggerated prickly heat, as itching and papulæ were absent; ephemeral fever was negatived, as the mental faculties were not impaired and the attack was so transient. Certainly it was an extraordinary instance of excessive elevation of the body temperature; and my impression was strong that the patient had been saved from brain mischief.

The same day another case worth mention came under my notice. While going the usual round of the wards that evening I happened to meet the eye of a man in bed with an ailment unconnected with the oppressively sultry temperature prevailing. As I looked his eyes began to redden and to glare, whereupon I ordered leeches to be applied immediately to both temples. While blood was being drawn, the man, feeling relief, exclaimed, "You have saved my life!" It was evident that the threatening of heatstroke was being averted by the lessening of brain circulation pressure; the case did well.

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#### TOXÆMIC ARTHRITIS AS A COMPLICATION OF ACUTE DYSENTERY.

BY CAPTAIN W. E. C. LUNN.

(*Royal Army Medical Corps.*)

LIEUTENANT H. was admitted to the Station Hospital, Lahore Cantonment, on July 3, 1913, suffering from acute dysentery. He attributed the attack to a chill caught during a long train journey taken two days previously. Amœboid bodies were present in the fæces, and were thought to be the cause of his condition. The patient was placed on a whey diet and treated with subcutaneous injections of emetine hydrochloride and a preliminary dose of castor oil and opium. The emetine was discontinued after two days as the patient got worse, and magnesium sulphate in one-drachm doses every two hours was substituted. Immediate improvement set in; this was considered to be possibly due to a delayed action of the emetine, so on the following day the magnesium sulphate was stopped and the emetine injections were recommenced.



Within twenty-four hours all the symptoms became exaggerated and the temperature rose. I decided after this experience to adhere to the magnesia sulphate treatment. The dysenteric symptoms had completely disappeared by July 18.

The patient complained on July 15 that his right ankle was painful. On examination it was found to be slightly swollen and red, and there was a rise in his temperature. The ankle condition had subsided by the next day, but the left knee had become very painful and his temperature continued to rise. On July 17 there was a sudden and sharp outbreak of acute arthritis in the right ankle, left knee and left elbow; the temperature rose to 101° F. This was accompanied by a well-marked purpuric rash (peliosis rheumatica) over the lower part of the abdomen, thighs and left leg. Several days later many of these spots turned to minute abscesses and gave him considerable trouble. Salicylate of soda, gr. xx, was given every two hours, the joints were painted with glycerine and belladonna, and cased in wool.

The general condition of the patient was now pitiable, in addition to the above complications he was covered with prickly heat; there was also acute conjunctivitis in both eyes, and a small ulcer had developed on the left cornea. All movements caused him intense pain, but fortunately the bowel condition had improved. The patient was unable to rest without morphia. Steady improvement was noted during the next few days with the exception of the left knee; this joint continued to swell until it felt like a bag of fluid. On July 21 the knee was tapped in consultation with Major Forster, I.M.S., and a clear sterile fluid was drawn off, to the great relief of the patient. The patient from this date continued to improve in every way. There were occasional slight relapses in the joints already affected, and he suffered from fresh pains in other joints. He had also the misfortune, as if his troubles were not already sufficient, to contract dhobie itch. He was able by August 10 to be transferred to Karachi. I received a letter from him in September, just previous to his proceeding home on sick leave, and he informed me he still had slight stiffness in his knee and ankle, but was able to walk about slowly without assistance.

There are several points of considerable interest in this case, which, despite the fact that amœboid forms were discovered in the fæces, was probably one of bacillary dysentery, for the following reasons:—

- (a) The acute onset and short period during which the actual bowel trouble lasted.
- (b) No improvement following emetine injections.
- (c) The marked improvement after magnesium sulphate.
- (d) The absence of relapses.
- (e) The presence of toxæmic arthritis.

The last condition deserves some consideration on account of its

rareness. The arthritis might have been considered as a concomitant attack of acute rheumatism or gonorrhœal rheumatism.

Acute rheumatism was suggested by the way the inflammation spread from joint to joint, its onset during the damp rainy season, and the presence of peliosis rheumatica. Gonorrhœal rheumatism by the large accumulation of fluid in one joint.

The arthritis in this case was, however, distinguished from rheumatism by the absence of profuse sweating during the attack, by the slight relief obtained from the use of salicylates, and the ultimate large accumulation of fluid in the knee-joint.

From the second condition it was distinguished by the absence of discharge from the penis, no history of gonorrhœa, the clear sterile fluid from the knee-joint, the presence of peliosis rheumatica and the speedy convalescence.

I am inclined therefore to consider the joint symptoms as purely toxæmic after an acute attack of bacillary dysentery.

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#### CLINICAL NOTES ON A CASE OF ECLAMPSIA.

By MAJOR J. TOBIN.

*Royal Army Medical Corps.*

Mrs. G., aged 22, a primipara, was delivered on December 5 at 2.30 a.m.; about 8.30 a.m. she had an eclamptic seizure passing through a tonic stage, followed by a stage of clonic contractions; respiration was in abeyance, the trunk in a condition of episthotonos, the face livid and tongue protruded. Several fits recurred in rapid succession. The patient had suffered from some well-marked pre-eclamptic symptoms for about two months before the onset of labour, viz., swollen feet, puffy eyelids, severe headache, mostly frontal, backache and diplopia. She was advised to see a medical officer, but did not do so as she was off the strength and understood that she had no claim to medical attendance. When first seen in the seizure she could swallow and was given 3*ii* of croton oil on the back of the tongue, followed later by large doses of magnesium sulphate;  $\frac{1}{2}$  gr. of morphia hydrochlorate was injected into the arm. She was placed on her side and hot fomentations were employed every two hours over the loins. The patient was seen to be under the influence of morphia until about five hours after the first injection, when she started fibrillary twitchings, followed by a severe fit; another  $\frac{1}{2}$  gr. was injected; the injections were continued,  $2\frac{1}{2}$  gr. being given in twenty-four hours. Arrangements were made in case of coma supervening for subcutaneous injection of a solution of sodium bicarbonate 2 dr. to the pint of sterile water, on the principle that this treatment does good in diabetic coma. It is now the opinion of the best authorities



(*vide* Trench and Tweedie) that when normal saline is injected the **salt** is not excreted if the kidneys are diseased, and the fluid is **retained** in the more solid tissues. In addition the nurse was also **instructed** to perform artificial respiration and give oxygen if respiration **ceased** during a fit.

An examination of a specimen of urine removed by means of a **catheter** showed the presence of much albumin, blood cells, but no **tube-casts**.

After twenty-four hours the morphia was stopped, no more fits having **occurred**.

She made a good recovery and is now quite well again. I have to **thank** Captain J. J. D. Roche, R.A.M.C., for assisting me in the **treatment** of this case.

#### WITH A CAMEL SECTION, FIELD AMBULANCE.

By LIEUTENANT AND QUARTER-MASTER C. W. KINSELLA.  
*Royal Army Medical Corps.*

SOME account of a month's training in field ambulance duties with camel transport, recently carried out for the first time by the corps personnel serving in Egypt, may be of interest to our readers.

The camp was formed at Mena, some 9 miles from Cairo, on November 5, with Major Potter as O.C. and Instructor, and Lieutenant and Quarter-master Kinsella as Assistant Instructor; and the personnel from the various stations (divided into three equal parties) attended in turn, giving eight working days to each contingent.

The syllabus of training embraced corps drills and exercises, the distribution, packing, &c., of field equipment, tent pitching with Indian pattern and mountain service tents, bivouacs, the digging of field kitchens, incinerators, and latrines, and the various methods of filtering and clarifying water.

Three days were spent by each class in field operations, on the last day of which a prepared scheme was carried out in conjunction with the regimental stretcher-bearers of the infantry battalions, who established regimental aid posts and carried out the duties allotted to them on service. The R.A.M.C. personnel was divided into a bearer and tent subdivision, and erected a dressing station, with operating tent, tents for sick, kitchen, &c.; meals were cooked on the ground and extras prepared for the patients.

The following is one of the three schemes prepared, and was carried out in conjunction with the regimental stretcher-bearers of the 1st Suffolk Regiment:—



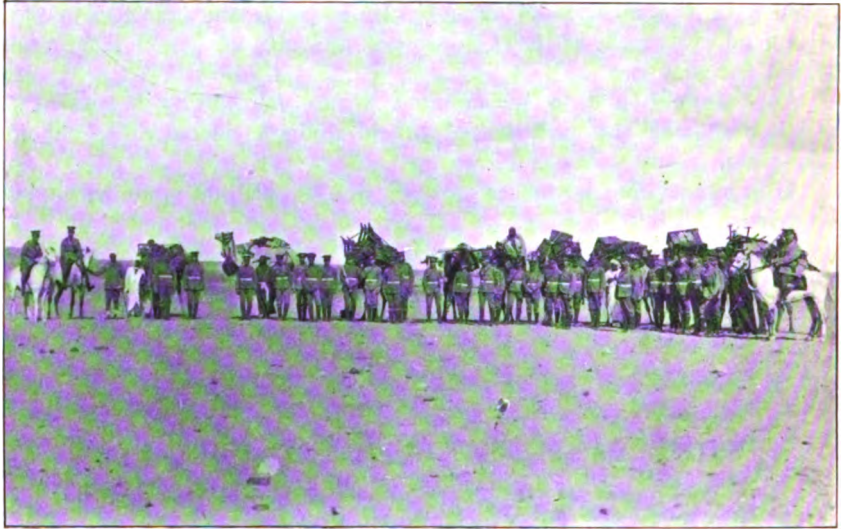


FIG. 1.—Section with Camels.



FIG. 2.—Section on the March.

**SCHEME OF OPERATIONS TO BE CARRIED OUT IN CONJUNCTION WITH THE  
REGIMENTAL STRETCHER-BEARERS, 1ST SUFFOLK REGIMENT, AT MENA,  
NOVEMBER 24.**

(Reference Map of MENA and DISTRICT.)

*General Idea.*

Night, November 23 and 24.

*1st Loamshire.*—A detached force, 400 men and machine-gun section, has been opposed by a numerically stronger force of natives and compelled to entrench for the night on SENTRY POINT, where the regimental M.O. is killed during the night by "snipers."

*Special Idea.*

Daybreak, November 24.

The enemy having drawn off, the O.C. Loamshires is anxious to advance, but is hampered by want of medical assistance. One Section Field Ambulance is mobilized and ordered to proceed to CAMP VALLEY.

*Operation Order No. 1, by Major T. J. Potter, R.A.M.C., Commanding  
Section "B" Field Ambulance.*

(Reference Map of MENA and DISTRICT.) CAMP VALLEY.

November 24, 1913.

Section "B" Field Ambulance will march to WHITE RIDGE and erect a dressing station under Lieutenant Savage, R.A.M.C. (T.F.); Captain Elvery, R.A.M.C., will report to the O.C. Loamshires at SENTRY POINT and assume charge of that unit's stretcher-bearers, establishing a REGIMENTAL AID POST at BOGLE CORNER.

Communication will be maintained by semaphore.

The carrying out of field operations was purposely spread over the three days, the instructions, plans, &c., being given in detail on the first day, to familiarize all concerned with their duties. On the second day, the personnel were left to work by themselves, mistakes being subsequently pointed out.

To cause emulation, the third day's proceedings were judged as a competition, marks being given for rapidity in pitching the dressing station, correctness in pitching and equipping tents, &c.

The second class under Staff-serjeant Colls, R.A.M.C., completed the task in thirty-two minutes, while the pitching and arranging was so well done that 99 per cent marks were awarded.

Tallied wounded (96 cases in all) were dealt with, first by the regimental bearers, who then passed them on to the bearer subdivision and dressing station, where the A. and D. Book was completed, the patients allotted to tents, and Army Book 39 kept going by the wardmaster.

Cases suitable for operation were dealt with in the operating tent, where the personnel were made familiar with the various instruments, &c.,



necessary in each case, and a description of the procedure to be carried out was given by a medical officer.

Each class was also given a night operation, when tallied wounded were collected over a considerable area of rough ground and sandhills.

Wheeled transport being impossible in the heavy desert sand, camel transport, and a desert cart, designed by Colonel A. F. Russell, C.M.G., D.D.M.S., were used.



FIG. 3.—The Kitchen.

Ten baggage camels were found to be necessary to convey the section's equipment, and these when unloaded were fitted up with camel cacolets, Egyptian pattern, and used for the conveyance of patients. The desert cart is formed of two bamboo poles, each 14 ft. long. One half of each pole makes a shaft, and the other half one side of the body of the cart. The sides are connected by two strong transverse bars of wood, placed one at the back and the other at the front of the body. The poles are 4 ft. apart at the back of the cart, and 3 ft. apart at the front end of the shafts. The front transverse bar is longer than the width of the cart, so that two stretchers opened out may rest on this bar if necessary. The floor of the cart is formed of a wire woven mattress (or a strong string net can be used), securely fastened to the sides and transverse bars. The cart is mounted on a pair of "sand" wheels, so that it stands 3 ft. 6 in. from the ground when level. The wheels are 4 ft. in diameter, with tyres 5 in. by  $\frac{1}{4}$  in. The ends of the shafts are fitted with hooks for a lead mule. Two lying-down cases, either with or without stretchers, can be carried.



The division of the equipment into camel loads and its loading and unloading afforded much valuable experience, not entirely unrelieved by some peculiar antics of the animals concerned. The desert cart after being subjected to severe tests was found a most suitable vehicle for desert work.

The health of all ranks was excellent throughout, and the men returned to their hospitals much benefited in every way by their experiences in the desert.

#### A DEATH FROM HYDROPHOBIA.

*An extract from the Diary of Frances Lady Shelley, 1818-1875 (published by John Murray).*

BY MAJOR H. A. BERRYMAN.

THE diary and letters contain much of interest about the great Duke of Wellington and other celebrities; but the account of the death of Charles, fourth Duke of Richmond, born 1764, a General in the Army and at the time of his death Governor-General of British North America, is singularly interesting and pathetic.

Lady Shelley writes: "I have received a letter giving a full account of the Duke's death:—

"You have doubtless heard all that we know about the Duke's death. Hydrophobia was the cause beyond all doubt. He had been bitten by a fox six weeks before. The fox had died in a fit two days after.

"Nothing exceeded the magnanimity and fortitude displayed by the Duke from the moment he was aware of the nature of his malady. He well knew that there was no hope of a cure, or even delay in its fatal termination; but he carefully concealed this from those who were with him. When at Perth he complained of not feeling well; but desired that a large party should be asked to dinner. When the hour arrived, he said that he did not feel quite well enough to sit at table, and had his dinner sent to his room. He did not eat much and drank nothing. In the evening he desired his servant to bring him a glass of negus; and said that he would take it and go to bed. When the man brought it to him, the Duke looked at it, shuddered and turned away. Then recollecting himself he said, 'I dare say it is very good, my good Baptiste, but I have changed my mind. Take it away and bring me pen, ink and paper.' He wrote a letter to Lady Mary Lennox and gave it to Baptiste, saying: 'The moment she arrives, give this to Lady Mary,' and seeing the man look surprised he added, 'I know that I shall arrive at the same time; but I may not give it her myself, do you therefore take care of it.' Some time after the Duke said to his servant, 'When I am to wash, in the morning, do not bring me water; but dip a towel in water, and bring it to me squeezed dry.' I mention this to show you that he was perfectly

aware of his situation, and heroically concealed it. The Duke proceeded on his journey with increasing spasms of the throat and shoulders. Whilst walking through a swamp, Major Bowles, who was close to him, stepped into some water and made a slight splash. The Duke sprang aside quickly and exclaimed 'Bowles, what connexion can your treading in the water have with my shoulder? Yet it gave me a dreadful spasm.' On reaching the first resting place the Duke asked Baptiste for the letter he had given to him; and added considerably to it. He then gave it to Major Bowles, with the same injunction as to immediate delivery. Major Bowles smiled and said: 'Your Grace will arrive as soon as I do, pray will you not give it yourself?' 'I am not so sure of that, little Major,' replied the Duke. 'I may arrive *as soon* as you do, and yet not deliver it myself, so keep it. I wish Lady Mary to have it *a few minutes before I arrive where she is.*'

"On reaching a ravine his spasms increased, and the party experienced so much difficulty in getting the Duke across it, that they feared a brain fever was coming on. They never once suspected the real cause. Many interesting things happened on the route, a narration of which would swell my letter to a tedious length, so I will spare you. At last a river was reached, and a boat was procured to take the party down for about seven miles, where they would meet horses that Colonel Cockburn and Major Bourke (who had walked on through the woods) were to have ready for them.

"On coming up to the boat the Duke asked if there was no other possible way to get him down. They told him there was no other way except on foot, to which he was not equal. He appeared to be much agitated, and very reluctant to enter the boat. At last he said, 'Tie a handkerchief over my eyes, and lead me to the boat, for I cannot get into it by myself.'

"This was done, and the Duke threw himself flat on his face and clutched the sides of the boat. As the boat was pushed off Major Bourke's suspicions were aroused, and he whispered to Colonel Cockburn that it must be a case of hydrophobia.

"They were exceedingly horrified at the thought of what might happen before they reached Montreal. Before they had proceeded twenty yards the splashing of the water disturbed by the oars caused the Duke violent agitation. He kept on crying out, 'Take me on shore instantly or I shall die!' They put back at once; and the moment the Duke set foot on land he broke away from them and fled through the woods, leaping over fences and other obstacles with all the agility and strength of a hunted animal flying for its life!

"The Duke's terrified attendants after they had lost sight of him were in great distress. They followed as quickly as they could, and at last caught sight of the Duke flying before them like a madman, without his hat, and covered with mud. With great difficulty they managed to

keep up with him, and saw him enter a barn with a rush, and throw himself upon some straw. He cried out, 'Here Charles Lennox meets his fate.'

"During the remainder of the day he had fitful rest, broken by violent spasms in his throat. He refused absolutely to go to the farmhouse, fearful of meeting a river, or water in some other form. During the moments of delirium he fancied himself with the Duke of Wellington in battle; he cheered on his men and rallied them, &c., with all the fire and impetuosity of a hero bent on victory. He then seemed to think there was fighting in defence of Quebec; that he had been wounded and was dying. He expressed a wish to be buried under the ramparts. Then the scene would change and the cause of his suffering would come into his mind; 'I beg that you will take that nasty beast out of the room!'

"Will nobody throw the animal overboard? Pray buy him from the man, pay him well, and throw the nasty animal overboard!' Major Bowles, who held in his arms a favourite dog of the Duke's, the dog in whose defence from the fox the Duke was bitten, exclaimed 'Here is the animal, I will take him away and destroy him.' The Duke looked up, and recognizing 'Blücher,' said, 'No, no, not my faithful Blücher, give him to me,' and he kept the dog by him until he died. When composed the Duke was heard to say in a low voice, 'Richmond! for shame; is this your courage?' and then 'Charles Lennox, rouse yourself; you have faced death before.' He then spoke of his family, of Lady Mary, as his pride, his comfort, his darling child, and also in the highest terms of Lord March. At eventide they persuaded the Duke to allow them to carry him to a small house that was near, where a small bed had been prepared for him. There he passed the night in delirium, in agony, with occasional interludes of comparative composure. But he was always frothing at the mouth. At last an army surgeon from Richmond arrived. But nothing could be done. All his intervals of ease were spent in giving Major Bowles directions relative to his family; and in touching appeals to God for pardon, and for resignation and courage. At about 8 o'clock the next morning, after a brief repose from intense agony, which he supported like a Christian hero, he died without a struggle. His death, so rapid, so unexpected, produced a feeling of consternation and distress better imagined than described. So harrowing had been the events of the three preceding days, that the Duke's attendants could scarcely realize them; and the task which lay before them was too painful to be thought of, and yet there was no time for indulging in grief. A coffin was made with such materials as they could procure. The body was already in such a condition as to admit of no delay, and in eight hours after the Duke's death they placed the remains of that illustrious soldier, their beloved patron and friend, in the same boat from which he had flown on the previous day. With aching hearts the faithful little band conveyed the Duke of Richmond's body to Montreal."

*J. Roy Army Med Corps*  
*V. 22, 1914*  
*P 320 - 334*

## **Echoes from the Past.**

### **THE STORY OF THE ARMY SURGEON AND THE CARE OF THE SICK AND WOUNDED IN THE BRITISH ARMY, FROM 1715 TO 1748.**

BY MAJOR H. A. L. HOWELL.  
*Royal Army Medical Corps.*

#### **PART I.**

At the death of Queen Anne the total strength of the army had dwindled down to 7,813 in Great Britain, 5,000 on the Irish establishment, 1,895 (three regiments) in Flanders, and some regiments and independent companies in the Colonies. The army had been reduced by two regiments of cavalry (7th and 8th Hussars), four regiments of foot (22nd, 29th, 33rd, and 34th Regiments), and three regiments of Marines. These regiments were, however, re-established by George I in the first half of 1715, the marines becoming the 30th, 31st, and 32nd regiments of foot.

The strength of the army depended from year to year on the exigencies of the time. The army was very unpopular. "No Standing Army!" was the popular cry at the hustings, and great political capital was made out of this unpopularity. The reasons are not hard to discover. The people still remembered Cromwell's military despotism and their fears of James II's army. The character of the men, enlisted as they were from the dregs of the population or by impressment (in one day 1,000 recruits for the army were raised from the prisons and houses of detention of London and Westminster), did not tend to make the soldiery popular. In addition, those politicians who were Jacobite at heart were anxious to keep the army as weak as possible in order to favour the success of a Jacobite rising at any time. They were so far successful that at one time not 4,000 men were available to resist invasion without leaving the King, the Capital, and our fortresses defenceless. Fears of Jacobite risings, in fact, led to an increase of the army, in July, 1715, by thirteen regiments of dragoons and eight regiments of foot, and, in 1716, five regiments of dragoons and eight of foot were added to the Irish establishment. These latter were again disbanded in 1717, and three others in 1718. It was not until 1722 that Walpole at last fixed the peace establishment of the army at 18,000 men.

The commissions of most of the medical officers of Queen Anne's time were confirmed by her successor, and, as new regiments were



raised, surgeons were appointed to them. The late Surgeon-General A. Gore estimated that in 1718 the total medical staff of the army did not exceed 170 officers. My own estimate, for 1715, is a minimum of 173 medical officers, staff, regimental surgeons, garrison surgeons and physicians, and surgeons' mates. The names of most of the commissioned medical officers of George I's reign have been collected for us by the late Mr. Charles Dalton. He names few surgeons' mates, the reason being that mates were not commissioned but warrant officers.

By Royal Warrant, on May 26, 1716, the Royal Artillery was permanently established. Two companies (9 officers and 92 men) were raised at first, but two more were added in 1727, when the title of Royal Regiment of Artillery was conferred upon it, and, Gore says, a surgeon and surgeon's mate were for the first time attached to it. Before this, whenever an artillery train took the field a surgeon was attached to it, and sometimes a surgeon's mate also. Johnathan Keat, Chirurgeon, with yearly pay of £91 5s., was medical officer to the train of artillery in Ireland in 1716. In the artillery at this time all appointments were made by the Master-General of Ordnance, artillery officers not getting King's commissions till some years later.

In addition to the surgeons appointed to regiments, surgeons were appointed, as in former reigns, to the garrisons of Sheerness, Kingston-on-Hull, Tilbury Fort, Portsmouth, Edinburgh Castle, Inverness, and Berwick-on-Tweed. King George also confirmed the commission of "William Smith, M.D., to be Physician of Our Town and Garrison of Portsmouth." There were apparently few commissions as physicians in Britain in peace time, for this and that of Physician to the Tower of London are the only two I can find recorded. Abroad, surgeons and surgeons' mates were appointed to Forts St. Anne and St. Philip in Minorca, surgeons to the Independent Companies of Foot at Jamaica, the Bahamas, New York, and South Carolina, and surgeons to the garrisons of Annapolis Royal in Nova Scotia, Placentia in Newfoundland, and Gibraltar. On March 1, 1727, Dr. William Neilson was gazetted "to be Director and Purveyor of Our City and Garrison of Gibraltar, Dr. Alex. Sandilands to be Physician of do., and Wm. Scott to be Master Surgeon of do." (Sandilands had been surgeon to the hospital at Dunkirk in 1712, and afterwards served as physician in the hospitals in Flanders during the war of 1742-48. He was on half pay in 1749). These appointments to Gibraltar are of interest, for they were made just after the siege of 1727 had



begun, and the medical officers named were present during the greater part of the siege.

We may also note the appointments to the higher ranks of the Army Medical Service during the reign of George I. "Sir Samuel Garth to be Physician-General of Our Land Forces, 15th October, 1714." "Alex. Inglis, Esq., to be Chirurgeon-General to His Majesty's Forces, 28th January, 1715." "Benjamin Teale, Esq., to be Apothecary-General to His Majesty's Forces, 28th Jan., 1715." "Dr. Thomas Gibson to be Physician-General of Our Land Forces, 23rd Jan., 1719." "Sir Hans Sloane, Bart., to be Physician-General of Our Land Forces in room of Thomas Gibson, decd. 18th July, 1722." "Thomas Graham, Esq., to be Apothecary-General to Our Army, 18th May, 1727."

In Ireland, Thomas Proby was still Chirurgeon-General. John Freind, M.D., was removed from office and succeeded by John Campbell, M.D., as Physician-General, on February 14, 1714. Thomas Molyneux, M.D. (who afterwards became a Baronet) was made Physician-General in Ireland on May 1, 1718. He resigned and was succeeded by Upton Peacock, M.D., on February 10, 1725.

At Chelsea Hospital, Alexander Inglis was reappointed surgeon, April 19, 1715, Dr. John Smart, physician, April 23, 1715, and Isaac Garnier, apothecary, April 19, 1715.

The great surgeon, William Cheselden, afterwards surgeon to Chelsea Hospital, was commissioned surgeon to Colonel Pocock's Regiment of Foot on March 2, 1717. This regiment was disbanded in the following year. This appointment is not noted in any biography of Cheselden and enables us to claim him as an army surgeon. The fact is noted in Cragg's "List of Officers displaced and of Officers appointed, dated Jan., 1717-18." (Brit. Mus. Add. MSS. 22,164, fol. 129.)

At this time regiments were rarely moved from place to place and on that account foreign service was greatly dreaded. The 18th Royal Irish were, for instance, in Minorca throughout the reign of George I. Officers got away on leave for long periods, so that colonial garrisons were often under-officered. Thus, in June, 1742, of the four medical officers appointed to Minorca only one, Daniel Cabrol, was present. We may note, in passing, that Daniel Cabrol was in 1722 (or 1723) given a grant of £45 12s. 6d. from His Majesty's Bounty "for his merit and length of faithfull service." He had been surgeon to Ingoldsby's Foot in 1696, surgeon to Cadogan's Horse in Marlborough's Campaigns, and was present at Blenheim. His share of the bounty paid to those who had served at Blenheim amounted to £18.

There had been no alterations in the pay of the medical officer. The Physician-General, Surgeon-General, and Apothecary-General each drew pay at 10s. a day. A surgeon in a cavalry regiment drew 6s. a day, in a foot regiment 4s. a day, and a surgeon's mate 2s. 6d. a day. In Ireland subsistence was also paid at the rate of 3s. a day for a surgeon and 2s. 4d. for a surgeon's mate. The pay of a surgeon to a garrison was 6s. a day, while the surgeon of an independent company drew 5s. a day. (Accounts of Paymaster-General 1722-23, and other sources.) At this time every man paid the surgeon 2s. a year, probably for medicines. (Regulations for stoppages of dragoons and foot, Miscellaneous Orders, June 28, 1720, confirmed in 1732.)

At the Record Office copies of several commissions of medical officers are preserved. That of Thomas Gibson, as Physician-General, runs as follows :—

1719.

George R.

George, &c., to our trusty and well-beloved Dr. Thomas Gibson, greeting. We reposing especial trust in your experience, prudence, and ability, do by these presents constitute and appoint you to be Physician-General of Our Land Forces raised and to be raised for Our service. You are therefore carefully and diligently to discharge the duty of Physician-General by doing and performing all, and all manner of things thereunto belonging.

And you are to observe and follow such orders and directions from time to time as you shall receive from Us or any other your superior officer according to the rules and discipline of war.

Given at our Court of St. James's the twenty-third day of January, 1718-1719, in the fifth year of Our reign. By His Majesty's Commands.

J. CRAGGS.

During this period there were very few barracks, the only ones being at the Savoy, the Tower, Hull and Edinburgh, barely capable of accommodating a battalion. In garrison towns only sufficient accommodation was maintained to hold enough men to keep the arms in order. The rest of the men were quartered in barns hired for the purpose, or in tents, but chiefly in billets in the inns, the only quarters permitted by the Mutiny Act. In Ireland, owing to the lack of inns, barracks were first introduced, a large grant being made for the purpose in King William III.'s reign. In Scotland they chiefly date from the rebellion of 1715. In England they

were miserably inadequate till a much later period. The first barracks in Great Britain built by King George I. are said to have been at Berwick-on-Tweed. (Macky's "Journey through Scotland," 1723.)

Strange to say, the fear of a standing army was the chief cause of the non-provision of barracks. Barracks were opposed by Blackstone, by Marshal Wade, and by others as late as 1792 (when a Barrack Department was introduced for the purpose of erecting barracks throughout the country), the reasons given being that barracks made slaves of the soldiers and made them a class apart from the people.

The army surgeon saw little service in the field during the peaceful reign of George I. The outbreak of the Jacobite rebellion in 1715 was met by vigorous measures. Eight thousand men were sent to the West of England where an invasion was feared, and fresh regiments were raised. In Scotland, where General Wightman had only 2,000 English troops, the Jacobites under the Earl of Mar had command of the whole country north of the Forth by October. He had 12,000 men with him. He sent a detachment into the North of England which was joined by many Jacobites, but they were surrounded at Preston in November and capitulated to Generals Wills and Carpenter after some fighting. Mar could not get south of Stirling where, in October, the Duke of Argyle had with him the Scots Greys, the 3rd, 4th, 7th Hussars, the 6th Inniskillings, and the 11th, 16th, 21st, 25th, and Grant's Regiments of Foot. In England were the 2nd Dragoon Guards, 9th Lancers, 11th, 13th, 14th Hussars and the 23rd, 26th and 27th Regiments of Foot. On November 13, Mar fought a drawn battle at Sheriffmuir, near Dunblane, against 4,000 English troops. The heavy English casualties, 23 officers, 354 men killed, and 11 officers and 142 men wounded, indicate the severity of the hand-to-hand fighting which occurred. After the battle Mar remained inactive and his forces rapidly melted away. In November an artillery train was sent to Scotland. It had a surgeon, John Pawlett, and an "assistant surgeon," Samuel Marshall. This is, I think, the first mention of an assistant surgeon.

There was a Jacobite landing in Ross-shire in 1718. The rebels, over 1,500 Spaniards and Scots, including Rob Roy and 400 Macgregors, were met and defeated at Glenshiel by General Wightman's force which included companies of the 11th, 14th, and 15th Foot. The English loss was 21 killed and 119 wounded. As a result of these Scottish campaigns the Black Watch was raised to

watch the Highland border, and General Wade was given a strong force to disarm the clans and open out the country by constructing roads.

In 1719 we were at war with Spain and an expedition was sent to Vigo. It consisted of ten battalions of foot and some artillery. On the staff of the artillery were Surgeon James Barnes and his mate, William Thynne. Vigo was taken in September and peace soon followed. The medical arrangements were purely regimental.

Gibraltar was besieged by the Spaniards in 1727. The siege began in February and lasted till June. The garrison at first numbered 1,500 men, but was afterwards raised to over 5,000. The regiments present were the Royal Artillery, the Foot Guards, the 5th, 13th, 14th, 20th, 25th, 26th, 29th, 30th, 34th and 39th, and detachments from Minorca under Colonel Crosby, 18th Foot. The older part of the town was destroyed by the Spanish bombardment and was afterwards cleared away to form what is now the Casemates Square. The Spaniards lost 3,000 men during the siege. Our casualties were 3 officers and 72 men killed, and 202 wounded. Thirty-four men died of wounds. There was a heavy loss from sickness during the siege and for some time afterwards. "The Guards lost upwards of 106 men, and the other regiments in proportion, but 'twas chiefly by sickness, and, as it appears, after the 12th June, so that by the lists (of casualties), which are most exact and true, above eight times as many died from distemper, occasioned, as it is thought, by want of fresh provisions, as well as by all the accidents attending the siege." (Dodd's "History of Gibraltar.")

The rations issued just before the siege were, according to a contemporary letter by William Sherer, the chief storekeeper at Gibraltar, "pr week for one man as pr contract, seven pound of biskit, two and a half pound of beef, one pound of pork, four pints of pease, three pints of oatmeale, six ounces of butter and eight ounces of cheese, except oyl is issued (in place of butter) & if required flower may be issued in lieu of bread." (Brit. Mus. Add. MSS. 23637, fol. 11.)

During the siege the Naval Hospital was taken over by the military. The Navy claimed it back in October, 1728. (Gibraltar Papers, Colonial Office 91.) This naval hospital was rebuilt in 1771, and much of it still exists. Accommodation was provided for 1,000 patients.

In 1727 George II came to the throne. During his reign the 42nd to the 70th regiments and 15 second battalions were added to the strength of the army, with a corresponding increase of surgeons

and their mates. In 1739, the army numbered 17,774 men; in 1740, 28,852.

War broke out with Spain in 1739. Admiral Vernon took Portobello, and it was decided to send an expedition to the West Indies. It was in its results a most dreadful example of how not to organize and conduct an expedition to the Tropics. The force consisted originally of 9,000 men under Lord Cathcart. Six regiments of marines, 1,100 men each, were raised in 1739, and 1,000 negroes were enlisted in Jamaica for service in Cuba. A large part of Cathcart's force consisted of young recruits, weedy boys not strong enough to carry their arms; being mostly newly raised troops they were badly trained and ill-disciplined. The guns were unserviceable and the newly enlisted gunners untrained. There was only one capable engineer, and he died early in the campaign. The provisions were bad. The troops were embarked, but the start delayed: there were not enough men to man the ships. In the meantime, the troops remained on board and consumed the greater part of the provisions for the voyage. Scurvy broke out on board, and in the first six weeks there were 60 deaths. At last, four months later, in October 1740, the ships sailed. Dysentery now appeared in epidemic form, and Lord Cathcart and 100 men died during the voyage. There was another delay at Jamaica, where 4,000 newly raised American troops joined the force. Sickness continued and, before the end of the year 1740, 17 officers and 600 men had died. In April 1741 the fleet was before Carthagená. General Wentworth, a thoroughly incompetent general, was in command, and there was great friction between him and Admiral Vernon. In the attack on Carthagená on April 20, the English soldiers fought splendidly, but were badly led. They were repulsed with a loss of 43 officers and 600 men killed and wounded. The 15th and 24th Regiments lost over one-fourth of their numbers. The troops had not landed their tents and the rains were beginning. Dysentery and yellow fever added to the horrors of the campaign. It is said that in four days of April the army of 6,600 men diminished to 3,200. It was now decided to return to Jamaica. Smollett, who was a surgeon on a man-of-war and was present, draws a dreadful picture of the state of things on board the transports. On May 5, when the fleet sailed, only 1,700 men were fit for duty. During the ten previous days the men were on board, but the ships lay idle in the harbour of Carthagená. Smollett writes, "The men were pent up between decks in small vessels where they had not room to sit upright; they wallowed in

filth; myriads of maggots were hatched in the putrefaction of their sores, which had no other dressings than that of being washed in their own allowance of brandy; nothing was heard but groans and lamentations and the language of despair invoking death to deliver them from their miseries." A point of interest in this expedition is that "hospital ships" were provided. These ships, however, had no medical personnel or equipment, no cooks, and practically no provisions. It would appear as if the sick were placed on board these ships whilst the surgeons remained with their regiments on the regimental transports. The dead were thrown overboard into the harbour where, after a few hours, they rose to the surface and floated about the transports, whilst sharks and birds of prey fought and scrambled for them.

During the next month 1,100 men died, and during the weeks that followed the mortality was 100 a week. By November there were not sufficient fit men to supply reliefs for the ordinary guards. In February, 1742, battalions of the Royal Scots, 6th, and 27th Regiments arrived from England.

In August an expedition was directed against Cuba. In Cuba, on October 5, 1741, the strongest regiment only numbered 237 and the weakest 99, rank and file. There were 566 sick in camp out of a total of 2,669 men. "And 218 officers have died in the expedition, viz., one Commander-in-Chief, 5 Colonels, 10 Lieutenant-Colonels, 7 Majors, 55 Captains, 116 Subalterns, 14 Staff Officers (includes surgeons). Ten in hospital." The force returned to Jamaica on November 29. The regiments in Cuba were eight in number and four battalions of Americans. Between March 8 and May 18, 1742, 33 regimental officers died in the West Indies (*Gentleman's Magazine*, 1742). By October, 1742, of the 4,000 Americans, only 300 were left, and these were dismissed. It was decided to attack Portobello, but, after nineteen days at sea, sickness led to such great loss that the expedition was finally abandoned.

It is estimated that of every ten men who left England with Cathcart only one returned. Of Wolfe's regiment, into which another had been drafted, only 96 officers and men came back to England. The 6th Regiment, originally 800 strong, had only 18 men left on its return home. Several surgeons died during the expedition. We learn from the House of Commons Journals that there were on this expedition to Carthagera a physician-general and a surgeon-general, with pay each of 10s. a day, and two surgeons' mates, each with 8s. a day pay. These mates were probably for duty in the hospital. Dr. Dalrymple, physician to

the army at Carthage, cured many cases of remittent fever by wrapping his patients up in blankets soaked with warm decoctions, a method of treatment brought forward as something new a hundred years later.

Ultimately the expedition straggled back to England. "They left behind them the bones of about 15,000 men, of whom the vast majority had succumbed to the effects of climate and to the neglect of all medical and sanitary precautions which disgraced this miserable campaign." (Gretton: "Social England.")

\* \* \* \* \*

The army had been increased in 1741 to over 29,000 men, and, on the fall of Walpole, in 1742, a further increase took place, bringing its strength up to 35,554. In the following year there were 23,160 soldiers at home and 16,389 in Flanders. These increases were necessitated by the War of the Austrian Succession, which broke out in 1741, and into which England was soon drawn.

Previous writers on the medical history of this war have derived their information from Sir John Pringle's great work, but the present writer has been fortunate enough to discover in a tract in the British Museum the full statistics of the hospitals during the war, their position and their physicians. In addition, the "General Orders" of the Duke of Cumberland give many interesting details, and the "Historical Memoirs of his late Royal Highness William Augustus, Duke of Cumberland," published in 1767, and contemporary journals have been drawn upon.

In May, 1742, 16,000 British troops, horse and foot, were sent to Ostend and quartered in Bruges and Ghent and the neighbouring towns. Apparently before this some details had been sent over to make preparations in Flanders, for a General Hospital was opened at Ghent on September 11, 1741. Dr. Sandilands was the physician. The war, in which this was the first step, lasted until 1748.

The troops landed in Flanders in good health and spirits and remained in their billets in and about Bruges and Ghent until February, 1743. Pringle tells us the weather was good and country healthy during the year 1742. The officers, who were in good quarters, kept healthy, but there was much sickness amongst the men, especially those quartered in Ghent, mostly on the ground floors of waste houses which were damp and without drains. In July one battalion had 140 sick and of these only two came from the companies on higher ground. At Bruges, which is lower and moister than Ghent, there was also much sickness. In August the troops were moved to better quarters and the sickness diminished. The



General Hospital at Ghent, between September 11, 1741, and December 24, 1742, admitted 442 sick. Of these 82 died.

In February, 1743, the campaign really began. Orders were received for the troops to concentrate about Höchst on the Main, in Germany. The route lay through St. Tron (Liège), Tongres, Maestricht, to Aix la Chapelle. The weather was bitterly cold and snow blocked the roads, so that here the march was interrupted and the troops went into quarters about Aix la Chapelle. On April 26, the march was resumed through the Duchy of Juliers and the Electorate of Cologne and, crossing the Rhine at Neuwiedt on May 14, the troops encamped on May 23, near Frankfort. The allies now numbered 44,000, the British having been joined by 12,000 Austrians and 16,000 Hanoverians. On the other side of the river Main was Marshal Noailles with a French Army of 58,000 men. The allies moved up the river to Aschaffenberg, with their base at Hanau. The road lay between the river and the Spessart Mountains, spurs of which come down almost to the river. Supplies were for a time brought up the river in boats, but the French soon stopped this and our troops began to suffer from want of food. For some days before the battle of Dettingen they were on half rations. King George was with the army, which was commanded by the Earl of Stair. The French seizing the bridge over the river at Seligenstadt, Stair found his communications threatened and his advance prevented. It was therefore decided to return to Hanau. Noailles at once occupied Aschaffenberg, there capturing a British Flying Hospital, and marched the remainder of his troops along the south bank of the river, where he mounted guns, and threw the flower of his army, under the Duke de Grammont, across the river at Dettingen where they formed up astride the Allies' line of retreat.

On June 16, the battle of Dettingen was fought. The British regiments present were the Blues, the Life Guards, the Royals, the Scots Greys, the 3rd, 4th, 6th and 7th Dragoons, the King's Dragoon Guards, the 7th Dragoon Guards and the Buffs, the 8th, 11th, 12th, 13th, 20th, 21st, 23rd, 31st, 32nd, and 33rd Regiments of Foot. The French were utterly defeated with a loss of 5,000 killed, wounded and prisoners. The British casualties were 265 killed and 561 wounded. The total Allied loss was 2,500. Stair wanted to follow up the French, but King George did not feel safe till he was in Hanau. There was heavy rain on the night of the battle, and, as the Allies had no tents and had to leave their wounded on the field, the inclemency of the weather occasioned great mortality amongst them.



Next day the Allies, owing to want of provisions, had to fall back to Hanau; upon which Marshal Stair sent a trumpet to Marshal Noailles, to acquaint him, "that his Brittanic Majesty having thought proper to remove to Hanau, he had left an independent company in the field, to take care of the wounded, who were strictly ordered to commit no hostilities: therefore the French might send a detachment to bury their slain; and it was hoped, they would treat with humanity those who were left behind." Marshal Noailles immediately sent a party of horse from Aschaffenberg, who removed the wounded of both armies to the French hospitals, where the English had the greatest care and humanity shown them by the French, but were detained prisoners of war. The desertion of the sick and wounded by the Allies was severely censured. Hanau was not more than a day's march from the battlefield, and one would think the Allies could have carried their wounded with them or stayed on the field till provisions and transport came up from the base at Hanau. Noailles, however, still had command of the river, which might have otherwise been used for sick transport by boat, and he also had about 30,000 untouched troops. The Allies were in want of food and had no transport. Some extracts from letters from the field, which appeared in contemporary journals, give the best idea of the state of affairs. An officer of the Royal Welsh Fusiliers, writing from Hanau, says: "I have not been under cover above two nights in fourteen. The night after the action it rained without intermission till eight next morning, very violent." A guardsman wrote: "We are almost starved, I have had nothing but ammunition bread this fortnight, and water or sour wine. Before we engaged we threw our baggage away. Though we far'd so hard our courage did not fail us." A trooper wrote: "We had neither Victuals, Drink, or Tents to lie in after the Work was over." According to the "Old England Journal," No. 40, "only thirty wagons were to be found in the whole British Army upon the day of our march to Dettingen, the Contractor had been paid for 400." This explains largely the failure to carry away the wounded. Although they were left on the field, Sir John Ranby, Sergeant Surgeon to King George (and afterwards the writer of a book on gunshot wounds, and surgeon to Chelsea Hospital), who was present, stated that the arrangements for the wounded were excellent. Some sort of a hospital was perhaps on the field, for the French accounts of the battle say that a British hospital fell into their hands. This may mean, however, the hospital at Aschaffenberg which we know we abandoned to them. Sir John Pringle was also present at the

battle as physician to the Earl of Stair. We read that he sat in a carriage during the fight. He had nothing to do with the medical arrangements but records some interesting facts about the campaign. He says that just before the concentration near Frankfort a Flying Hospital was opened at Nied (Wied?) which in three weeks admitted 250 sick, and at Aschaffenberg another hospital was established in a large, dry, airy field. Here 500 sick were left, representing one-twenty-ninth of the British force. This hospital fell into the hands of the French.

On April 9 a General Hospital had been opened at Feckenheim, a village a league from Hanau, the advanced base. Dr. Sandilands was physician here. He had left the hospital at Ghent still open, in charge of "Apothecaries Mr. Lawson and Mr. Ore." Ghent received 809 sick during 1743 and had 122 deaths. It is probable many of these had been sent back sick to Ghent from the army. On the return of the army to Hanau the hospital at Feckenheim became very busy. The army lay inactive, the weather was hot and the ground wet. A letter from Wisbad on July 31, says, "the army have by their inactivity so sickened that there is scarce a Regiment that has not from 100 to 200 in the Hospitals, most of the Flux."

During the stay of the troops around Hanau the general hospital at Feckenheim accommodated 1,500 sick, besides wounded, dysentery being the principal disease. The hospital was terribly overcrowded and there broke out an epidemic of "malignant hospital, or jail fever" (typhus and typhoid at this time were not distinguished from each other). The infection spread to the hospital staff and to the inhabitants of the villages. Between its opening on April 9, and its closing on October 23, 1743, the hospital at Feckenheim admitted 3,386 sick, of whom 1 in 5, that is 640, died. There were also admitted 175 women (91 deaths), and 111 children (53 deaths). These were probably the wives and children of soldiers who, in those days, "followed the drum" even in war-time. The troops were moved to Worms and encamped on dry ground and the sickness lessened. The army advanced to Spire, but returned to Worms in October. The weather was cold and rainy, and remittent fever became epidemic. On August 6 another General Hospital had been opened at Neuwiedt on the Rhine. Dr. Bailey, who became ill, was physician here. Eight hundred sick were sent down the Rhine to this hospital and many cases were transferred from Feckenheim, but these brought typhus with them and infected the other patients. Dr. Sandilands joined the hospital on

Feckenheim being closed. Neuwiedt Hospital was closed on November 26. During less than four months it had received 1,467 sick, of whom 397 died. Towards the end of the year 1743 the British troops returned to Flanders. The hospitals in Germany were closed, and the sick, to the number of no less than 3,000, were collected together and embarked in boats at Billanders and conveyed by water to the General Hospital at Ghent. On the boats the sick were crowded together under insanitary conditions. The fever became more virulent in type, and above half the number died during the voyage and many others after their arrival. The proportion of men left in hospital at the end of the campaign to those who came safe into garrison in Flanders was about three to thirteen. So ended the Dettingen campaign.

It will not be out of place if we now consider the medical organization in the field adopted during the campaign. It held good throughout the campaigns of the following years and was still unchanged in the Seven Years War. It was no new thing. Remember, many veteran officers and men who had served under Marlborough were engaged in this war of 1742-48. In an account of King William III's. campaign, which appeared in this Journal, the writer described King William's field medical organization. This was the organization still in existence in George II's. reign. Briefly, it was this. Each regiment had its surgeon and surgeon's mate. Some regiments had two mates. When in cantonments some building was taken over and converted into a Regimental Hospital. At such times the regimental sick were treated therein, and only serious cases or those not likely to become fit again for some time were transferred to other hospitals. In addition, there were larger hospitals, the Grand or General Hospitals, in the larger towns and at the base, to which the more serious cases were sent from the regiments. These hospitals had a separate staff of physicians, surgeons, apothecaries, surgeons' mates, purveyors and nurses. There was also an officer called the Director, usually, but not always, a medical officer, who administered the hospital. There was also, at this time, an administrative officer called the "Director-General of all the Hospitals." Charles Garnier held this appointment in Flanders in 1744. (He belonged to the family which, by letters patent, held the appointment of Apothecary-General to the Army for so many years.) There was also a Physician-General to the Hospitals who superintended the medical arrangements in the hospitals. Pringle obtained this appointment in June, 1746. Neither he nor the other physicians had anything

to do with the medical arrangements in the field. These were apparently directed by the senior surgeon, who also supervised the care of the surgical cases in the hospitals and had a great deal to do with the general medical arrangements, for we find, later, in 1748, the great improvement in their management and working attributed to Mr. David Middleton, a surgeon who was afterwards Surgeon-General. During the actual fighting the wounded were attended on the field by the regimental surgeons and their mates, and collected in houses and villages near the battlefield or placed in a few tents carried for the purpose and pitched in the rear of the regiment. Following close behind the advancing troops was another kind of hospital called originally "the Marching Hospital," but now "the Flying Hospital." The Flying Hospital had its own tents and transport, and medical, nursing, and transport personnel. When first instituted, each accommodated 200 sick or wounded men, but, later, we find them on occasion admitting more than this number. It took over the sick and wounded from the regiments, and when the army again advanced transferred its patients to the general hospitals, one of which was always opened from twelve to forty miles behind the troops in the nearest large town on the line of communications.

To the Dettingen campaign we also owe the first foreshadowing of the Geneva Convention. On July 28, 1743, a cartel for exchange of prisoners was concluded at Frankfort. This cartel was regarded at the time as remarkable, and formed the precedent by which the exchange of prisoners of war was regulated in the succeeding wars. It was entitled "A treaty and agreement for the sick, wounded, and prisoners of war of the auxiliary troops of his Most Christian Majesty, and for those of the Allies." It arranged for the rapid exchange of prisoners on both sides, or if no exchange was possible fixed the ransom to be paid for the different ranks. The 37th Article laid down that "physicians, apothecaries, directors, and other officers serving in the hospitals or armies shall not be liable to be made prisoners of war, but shall be sent back as soon as possible." Article 41 ran as follows: "That care shall be taken of the wounded on both sides; that their medicines and food shall be paid for; and that all costs shall be returned on both sides. That it shall be allowed to send them surgeons and their servants, with passports from the generals: that also those that have been taken prisoners, and those that are not so, shall be sent back under the protection and safe guard of the generals, with liberty to be transported by land or water, as the greater convenience of places shall permit:

however, upon condition, that those who have been made prisoners, shall not serve until they have been exchanged." Article 42: "That the sick on both sides, shall not be made prisoners: that they may remain with safety in their hospitals, where each of the belligerent and auxiliary parties shall be free to leave them a guard, which shall be sent back, the same as the sick, under the passports of the generals, by the shortest way, and without being liable to be molested or stopped. . So likewise shall all commissaries, or muster masters, chaplains, physicians, apothecaries, infirmarians, waiters or other persons proper to attend the sick; who shall not be liable to be made prisoners, and shall be sent back in the same manner." William, Earl of Albemarle, was the British representative who signed this treaty.

(*To be continued.*)

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## Travel.

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### A TRIP HOME FROM INDIA, VIA STRAITS SETTLEMENTS, CHINA, JAPAN, MANILA, HONOLULU, UNITED STATES, CANADA, THE PANAMA CANAL, AND WEST INDIES.

BY MAJOR C. T. SAMMAN.

*Royal Army Medical Corps.*

As most officers of the Royal Army Medical Corps express a wish to return from India by a more pleasant and interesting route than through the Suez Canal, perhaps the following notes of my trip may be found of use by others who are contemplating a similar journey.

First, let me strongly impress on the traveller's mind not to go to any tourist agency, but rather to deal direct with steamship companies, railways, and hotels. I shall be pleased to give definite reasons for this, in confidence, to anyone requiring them.

Baggage will be a source of much worry and expense, unless one is very careful, especially directly the shores of America are reached.

When setting out for a long voyage by sea and land, extending over several months, a large quantity and great variety of garments appear essential; experience, however, teaches that in reality



one can do with very little. I remembered, before starting on my trip, having met an American who was travelling round the world and had allowed himself seven years to complete it; his baggage was very scanty and was all in the carriage with him. I also cut down my baggage somewhat, but found when I arrived in the United States I had far too much from a financial point of view. Another friend I met in my travels, who expected to be travelling for perhaps a year longer, had gradually cut down his baggage to one steamer trunk and two suit-cases, an amount to which I strongly urge anyone to limit himself when crossing America; for although the United States railway companies will check your baggage without extra charge up to the amount you are allowed on your ticket (350 lb. on a round-the-world ticket), each piece, if checked to an hotel, will be charged 25 or 50 cents. I found it was always the higher figure if the checking was done by the hotel people. If you wish to leave any baggage at the stations, you are charged 10 cents for each article, for each day or part of a day.

Do not take any stiff-fronted shirts, they take up a lot of room, are easily creased, and are very hot. Soft-fronted shirts will be suitable to wear on every occasion you are likely to require evening clothes; they will answer every purpose, besides being more comfortable to wear during the day. As regards underclothing, do not take two varieties, as, when it is necessary (if it ever is) to wear thicker underclothing, you will find that putting on two thin suits will answer the purpose just as well as wearing one thick one, and if made rather loose they will be quite comfortable and easily put on.

When travelling in the States carry a small boot-cleaning set in your baggage, for you have to pay from 5 to 15 cents for cleaning boots, according to the part you are in, and even then the man expects a tip; whereas, if you have the things with you, it is quite simple to give your boots a brush before you start out in the morning. Now let me urge you to take as little as possible to start with, for in Japan you can buy all articles of wearing apparel, good in quality and cheap, especially silk and cotton-crape shirts, pyjamas, silk socks, ties, etc., also leather suit-cases (very light and cheap), and all varieties of trunks.

Before leaving Japan ascertain that your baggage does not exceed 350 lb., for the railway authorities will weigh most carefully



every piece of baggage they check, and the charge for excess baggage is enormous, and the distances are great. You need not weigh the two suit-cases. If you have been tempted to buy things in Japan (as most likely you will be) and your luggage exceeds 350 lb. have them sent home direct, via the Suez Canal, as freight.

Another thing to be very careful about is to ascertain that no packet measures more than 45 in., for under a new law which came into force on July 1, 1913, baggage measuring more than 45 in. is not allowed on a passenger train, unless at the extra rate of 5 lb. for every inch over the 45, in addition to the usual rate. This soon mounts up when the journey is over 3,000 miles. Now send all your baggage, with the exception of one trunk, and the two suit-cases which you can easily carry in your hand, in bond, through from your port of entry to your port of departure. This will cost you nothing except the 50 cents for cartage on each packet at each end; the customs will not charge you for storage. Be very careful to have your baggage securely fastened; it is better to have the trunks corded, but do so before you get to the custom-house or you will be charged 50 cents each piece. I had one of my trunks opened and some things taken out; it was the only trunk that was not corded.

If you visit such places as the Yosemite Valley and Yellowstone Park, as you probably will, these being the finest examples of natural scenery in America, you will be limited to 25 lb. or 50 lb. of baggage. There will not, however, be any objection to your two suit-cases, no matter what they weigh, if they are small and handy; so wherever you travel in America, stick to these two suit-cases and discard the universal stick or umbrella. A rain-coat will meet all your requirements as to protection from the weather, and can be strapped on to a suit-case when not worn. Plan out your trip for a week or two ahead, and send your trunk checked through to the place you are likely to be at the end of that time. Have it checked direct to an hotel, or send your check by post to the manager of the hotel, asking him to collect and keep it until your arrival, which he will do without extra charge, except the 50 cents for cartage.

I left my station, Mhow, on the last day of March, 1913, and sailed on April 6, from Calcutta, on the B.I. steamer, "Arankola." On board, I met an expert in Japanese works of art who was going out to make some large purchases. He told me, if I liked to



go with him, he would show me a side of Japanese life that the ordinary tourist does not see, particularly in relation to the manufacture of works of art and curios. I decided to take advantage of his kind offer, especially as, on arrival at Rangoon, a telegram announced that the berth on the new "Empress of Russia," for which I was trying, was not available. In the circumstances I decided to take a round trip on the Japanese liner, "Kamo Maru," from Singapore to Japan and back to Hong-Kong via Shanghai; this is not so extravagant as appears at first, for the return journey on the Japanese line is half-price, and the fare across the Pacific is the same whether the journey commences at Hong-Kong or Yokohama.

In Rangoon we did the usual thing, took a carriage to the Shwe Dagon Pagoda, then drove round the lakes, and went to McGregor's timber yard to watch the elephants stack the logs.

At Rangoon we transhipped to the B.I. steamer, "Edavana," for Penang and Singapore; had a look round these places, and at the latter changed to the Japanese liner, "Kamo Maru," a splendid boat, and very comfortable. During the voyage one of the passengers committed "hara-kiri," and was buried with great pomp at midnight. The corpse was placed in a square box, which was covered with white cloth, and had a candle stuck at one end and a flag at the other. It was floated off from the stern of the ship, the ceremony being performed by a Shinto priest in gorgeous vestments.

We arrived at Hong-Kong at daylight on April 22, and spent the day in looking over the place. We went up the Peak in the cogwheel railway, and had a lovely view.

The same evening we left by river steamer for Canton; the night was beautifully moonlit, and we remained on deck till we crossed the harbour and entered the river. At 5.30 we were up again to see the river swarming with boats, many of them propelled by women with babies on their backs. At Canton we hired chairs and a guide to show us over that wonderful city; the streets in the old portion are from 4 ft. to 7 ft. wide, and in the newer portions 10 ft., so that it is difficult for even two chairs to pass; the roadways are paved with blocks of granite with a drain running down the centre, which conveys the refuse to ditches crossed by bridges: the smell is too awful for words. The walls of the city are 6 miles in circumference, and from 20 ft. to 50 ft. thick. On the top of the wall near one of the gates stands the old water clock, built in A.D. 626, restored A.D. 947, and destroyed by fire and rebuilt A.D. 1346.



The water clock consists of four copper-covered jars, standing on stairs, so that the bottom of the higher is on a level with the top of the lower jar, and the water trickles from one to the other. In the lowest one is a stick which rises with the water and is marked off into half-hours. The watchman exhibits a board, on which the hour is marked, on the top of the wall. The water is put back from the lowest to the uppermost jar twice a day, and renewed every three months.

We visited the City of the Dead, where the Chinese keep their dead in sealed coffins, made out of tree-trunks, beautifully polished and lacquered. They place them in a room until such time as the astrologers or other wise men have determined on a site that will be suitable for the burial. The practice was to keep them here for years, but since the revolution they are only allowed to remain six months.

No pig-tails are allowed to be worn since the revolution, so that the Chinese have been robbed of one of their most characteristic features. I did not see one pig-tail in Canton.

We returned from Canton by train; the latter part of the journey was most picturesque, something like the loch scenery of Scotland.

We left Hong-Kong and went direct to Kobe, Japan, arriving there on April 29, and were told we had arrived just in time for the last of the celebrated Cherry Blossom Dances, held in Kyoto, the former capital; so, having lunched at the Oriental Hotel, we hastened up country to that city. There we stopped at the Miyago Hotel, and were met by a Japanese manufacturer, who took us to the Cherry Blossom Dance, where there were thirty-two geishas dancing and twenty playing different instruments.

The tea ceremony which precedes the performance, stripped of all non-essentials, demands a small room, perfectly quiet and clean, and away from all disturbances; one picture or autograph poem, good of its kind; one flower; a clean, fresh fire in the firebox; a kettle, a teapot, a tea-jar, cups, a bamboo dipper and whisk, and tea of the choicest quality, ground to a powder. When all the guests are assembled in one apartment, the host or hostess appears from another room and welcomes them; tea is now taken from the jar, and water, not necessarily boiling, poured on; this mixture is now whipped with the whisk, passed round, and each guest drinking in turn, wipes the cup and passes to his neighbour; when it arrives back to the host, he adds water and makes a second addition of weak tea, called "hsucha."

While at Kyoto we went to the different manufactories and warehouses of works of art, including Satsuma hand-painted porcelains, gold damascene, cloisonné, silk embroideries, cut velvets, etc. Some of the silk-embroidered kimonos cost £20, wholesale. The Japanese manufacturer invited us to a real Japanese dinner followed by a geisha dance.

Kyoto contains numerous palaces, shrines, temples, etc., one of which, Higashi Hongwan-ji, noted for being the largest in Japan, was built entirely by voluntary subscription from the people, and the ropes used to haul the gigantic timbers into position were made from human hair given by the women of Japan.

Near Kyoto is Lake Biwa, a large lake 38 miles long and 13 wide, and remarkable for being connected with the sea at Osaka Bay by means of a canal which joins the river Kamo. The canal is a wonderful engineering feat, designed by a young Japanese engineer. It is 7 miles long and has a gradient of 1 in 2,000 to 1 in 3,000, making a drop of 11 ft. along its whole course. There are three tunnels, one over a mile and a half in length. At the Kyoto end, instead of locks, an incline 1,820 ft. long connects the 118 ft. difference in level between the lake and the Kamo. Through the tunnels, which are in darkness, the trip down the canal is weird, but when they have been passed the scenery is beautiful.

From Kyoto we went to Nara, the capital of Japan from A.D. 709 to A.D. 781. It possesses a beautiful park, a lake, a temple, and a colossal bronze image of Bhudda in a sitting position, the "Daibutsu," 55 ft. high with a face 16 ft.

We next went to Nagoya, celebrated for its old castle and for being the centre of the cloisonné manufacture. From here we went to Tokio, the present capital, passing through beautiful scenery and skirting Mount Fugyama, the sacred volcano of Japan.

At Tokio we went over the carved ivory and bronze show-rooms; then drove over the city and saw the Imperial Palace, and went to see a Japanese play at the Imperial theatre, and, of course, to the world-famed Yosiwara, to see how Japan regulates the "Social Evil." From Tokio we went to Yokohama and then returned to Tokio, taking a motor to go to Ueno Park and see the wistaria, which was at the height of its glory. From here we went to Nikko. The Japanese have a saying: "Never use the word magnificent till you have seen Nikko." It is certainly beautiful up in the mountains, with the splendid gorgeous temples, the beautiful red-lacquered sacred bridge crossing the silvery Daiya-avenues of huge cryptomera, and the sparkling waterfalls.

From Nikko we went to Tonasawa, noted for its hot mineral-spring baths. We stayed at a Japanese inn (Fuku Musumme), dressing in Japanese costume, and eating Japanese food with chopsticks. When we were tired of this place we took a motor up into the mountains to Ashinoya, celebrated for hot sulphur springs, and from there we went to Hakone, a summer resort and one of the residences of the Crown Prince. From Ashinoya we went to Miyanoshita, supposed to be one of the most beautiful hill resorts in Japan; then, returning to the plains, took train for Kobe.

At Kobe the Japanese merchants met us and we decided what we wished to purchase. My things came to a considerable sum, the temptation to buy is so great when one sees the beautiful works of art Japan turns out; but as they were obtained at wholesale prices I had good value for my money.

We left Kobe on May 24 on the ship by which we had arrived, going through the Inland Sea to Moji and thence to Shanghai. Here we remained three days, and had a look at the celebrated bubbling well, the European concessions, and the native Chinese city; then left for Hong-Kong, arriving there on June 2. The following day, having said farewell to my travelling companion, I embarked on the Pacific Mail s.s. "Nile," for Manila, the capital of the Philippine Islands.

Manila is a quaint, old-fashioned, walled-in city, surrounded by a deep moat. The Americans are building a modern city outside the walls, and, incidentally, raising the cost of living to more than double what it was when they took over the islands. I went over Bilibid Jail, the governor, to whom I carried a letter of introduction, taking me round. It is a wonderful place, more like a school than a prison; all the inmates are given one hour's schooling each day, and are also taught a trade; they sleep together in airy dormitories, have good food, the cooks being some of the prisoners told off for the duty, and are allowed tobacco. I was much interested to see some of the prisoners doing bacteriological work in the laboratory. When the prisoners are discharged they easily find employment, and it is said the Filipinos commit crimes on purpose to be taken to prison and properly educated.

From Manila we returned to Japan, calling at Nagasaki. While the ship was in port I went across the mountains in a jinricksha to a very pretty watering-place called Mochi. From Nagasaki we went through the Inland Sea to Kobe, arriving on June 12. I went straight up to Kyoto to take a boat down the Hotxu rapids, which I had omitted to do before. From there



I went to Gifu, to see the famous cormorant fishing, which takes place during the summer months, commencing from the middle of June. The method is as follows:—

The fishermen first catch a cormorant; this is done by placing wooden models of the birds in spots frequented by them, and covering the surrounding branches and twigs with birdlime, settling upon which the cormorants stick fast. After having in this manner caught a cormorant, they use it as a decoy for catching more, instead of the wooden image. Cormorant fishing always takes place at night; a large brazier is hung over the bows of the boat, filled with burning wood and constantly replenished, so that a huge flare is kept up for attracting the fish.

The boat's crew consists of four men: the master, distinguished by the peculiar hat he wears, stands in the bow and handles twelve of the birds; amidships is another man who handles four birds; between them stands a man called the "*kako*," from a bamboo striking instrument of that name which he carries in his hand, and with which he makes the necessary clatter for keeping the birds up to their work; the fourth man stands in the stern and manages the craft.

Each cormorant wears round its neck a ring which fits tightly enough to prevent marketable fish from passing down, but is sufficiently wide to admit the smaller fish which serve as the cormorant's food. Round the body of each bird is a cord, attached to which at the middle of the back is a short strip of whalebone, for convenience in lowering the great, awkward bird into the water and lifting it out. A thin rein of spruce fibre is attached to this whalebone, 12 ft. long, and not too pliant so as to minimize the chance of entanglement.

When the fishing ground is reached the birds are lowered into the water and commence to catch the fish attracted by the light from the fire. When the bird is gorged it is lifted on board, the master forces its bill open with his left hand, still holding the other reins, and squeezes out the fish with his right hand. The cormorants are trained when quite young; once trained they work well for fifteen or twenty years. Each bird can catch from four to eight good-sized fish each time, which works out at about 150 per hour, or 450 for the three hours the boats remain on the fishing ground. At the end of the fishing the master can tell by each bird's weight if it has secured enough fish for its own sustenance; if necessary, they are fed with the inferior fish of the catch.

From Gifu I went to Yokohama, and stayed ten days, and from there went to Kamakura, the early capital of Japan. At the time of the Norman Conquest it was an important place, but is now nothing but a small fishing village, and a bathing resort for Yokohama and Tokio during the summer months.

At Kamakura there is another huge bronze Daibutsu and two temples. The surrounding country is very pretty, and the hotel, with grounds extending down to the beach, is very comfortable. I remained here till July 3, when I left Japan by the Japanese liner "Tenyo Maru," 20,000 tons, beautifully fitted up and very comfortable. There was a kinematograph on board for the amusement of the passengers.

We arrived at Honolulu on July 12 and hired a motor-car, in which to explore the island. The battleship "New Zealand" came in while we were there.

On Friday, July 18, we arrived at San Francisco, through the far famed Golden Gates which guard the entrance to the harbour. Next day, having had a look at the city from a motor-car, I arranged for my baggage to be sent to New York, in bond, and left by the night train for the Yosemite Valley, arriving at El Portal, or the gateway of the valley, at midday the following day. We then drove 16 miles up the mountains to an elevation of about 4,000 ft., to the Sentinel Hotel. The following morning we drove to the Mirror Lake to see the reflection of the sun as it rose over the mountain peaks; then took mules and rode up the mountain to Glacier Point, over 7,000 ft., passing by huge blocks of granite, one over 3,000 ft., and by waterfalls, from one of which the water drops over 1,400 ft. From here we drove 26 miles to Wawona, close to the Big Tree district of California. The following day we drove to see the trees: there are over 600 of them, the largest, which is said to be 8,000 years old and to contain a million feet of timber, is over 220 ft. high and 100 ft. in circumference. These trees grow at an altitude of 5,000 ft. to 7,000 ft.

Next day we drove 36 miles to El Portal, and took train for Sacramento, where I heard Governor Johnstone make a speech from the steps of the Capitol. From here I went to Salt Lake City, the home of the Mormons. It is a beautiful place, laid out in large blocks, each 250 yards square, the streets being planted with trees in stately avenues.

I went to the Tabernacle to hear an organ recital, on what is supposed to be one of the finest organs in the world; then went over the museum and saw many relics of Brigham Young and the

early settlers. From there I took a motor and went over the city, and then bathed in the Salt Lake; it contains 22 per cent of salt, so that one cannot sink, in fact it is difficult to get one's feet down so as to stand. From Salt Lake City I went to Yellowstone Park, coaching for 150 miles through some of the most beautiful natural scenery in the world, consisting of mountain forests at an elevation of 7,000 ft. to 8,000 ft., boiling geysers which spout to enormous heights at intervals, grand cañons, waterfalls, lakes, and mammoth hot springs. One night it snowed heavily and next day the forest looked lovely as we drove through it, with the spouting of the boiling geysers that were scattered about. From Yellowstone Park I returned to Salt Lake City on a Sunday morning and attended a Mormon service, then bathed again in the Salt Lake. Next day I went to Ogden and saw the Grand Cañon there, then went to Colorado Springs and spent a few days in the Rockies, ascending Pike's Peak. I started on a donkey, but the animal could not manage the climb, so I left him and did the rest of the way, 2,000 ft. elevation, on foot, and very exhausted I was when I arrived, owing to the rarefied air. I returned by the cog-wheel railway. The peak is 14,000 ft.

Then I went over the Cripple Creek line to the goldfields in the Rockies, through beautiful scenery, and also up the Moffat Railway, the highest broad-gauge line in the world, to the land of perpetual snow.

From Colorado I went to Denver City, 5,000 ft. above sea-level. The American Knights Templars were holding a conclave, and the city was beautifully illuminated. From here I went to Chicago, and of course inspected the noted stockyards, where they can kill and dress 7,000 hogs and sheep and 2,500 head of cattle per day. It was a wonderful sight. They say they turn everything there into money except the pig's squeal. I suggested they should take records of that for a gramophone.

From Chicago I went through the big lakes, Michigan, Huron, and Erie, by steamboat, stopping at Mackinac Island, Detroit, and Buffalo, then went on to Niagara Falls, which I saw thoroughly, both from the American and Canadian sides. The falls on the Canadian side are much finer than on the American, and one gets a better view of the Whirlpool.

I crossed Lake Ontario by steamboat to Toronto, then went on to Montreal, motored round the island of Montreal, and took a steamboat down the St. Lawrence rapids. From Montreal I went to Albany, and took the day river-boat down the Hudson to



New York, arriving on August 27. There, of course, I ascended the greatest inhabited building in the world, rising 784 ft. from the pavement and containing fifty-eight floors. It will house 10,000 tenants, has twenty-eight elevators with a combined height of 2 miles, covers 40 acres of land, has 3,000 outside windows, and is absolutely fireproof. No wood is used in its construction.

I left New York on August 30 for Antilla, Cuba, and from there went to Jamaica, where I met several old acquaintances; then on to Colon, the Atlantic entrance to the Panama Canal, arriving at daybreak on Sunday, September 7.

Most people have an idea that the plan of the Canal is very complicated, whereas it is really very simple. The plan is to form a large artificial lake, covering an area of 164 square miles; this lake is to be maintained at a level of 85 ft. by means of a big dam, in the centre of which is a spill-way, so that when there is danger of the water in the lake rising too high, the spill-way can be opened and the water allowed to run off, so that the lake may never rise more than 85 ft. above sea-level.

Vessels will be raised from sea-level into this lake through three flights of locks, and lowered again through another three flights of locks. A vessel going from the Atlantic to the Pacific will pass through a short sea channel, marked out by buoys, 7 miles long, 500 ft. wide, and 40 ft. in depth; it will then be raised 85 ft. above sea-level by three steps, through the three locks at Gatun. All locks are made in pairs, so that vessels can go in opposite directions at the same time; they are 1,000 ft. long, 110 ft. wide, and have a clearance of 40 ft. of water at the sills. At the upper and lower ends of the high lock in every flight the gates are double, one gate being a guard to the other in case it gets rammed or injured in any way. Each leaf of the gate is 65 ft. long, 7 ft. thick, and from 47 ft. to 82 ft. high, according to the lock; they weigh from 390 to 730 tons. About midway another gate divides the lock into two chambers, 600 ft. and 400 ft. respectively, one part only being used for small vessels, so as to economize water and power. All the water for raising and lowering the vessels in these locks is brought in and out through tunnels 18 ft. in diameter; these are controlled by electric force, as is also the opening and shutting of the gates; the whole is operated by one man in a tower on the lock side. Along the edge of the lock is a cog-wheel railway for electric locomotives, four of which are used to tow each vessel through the lock, two in front and two behind; the latter to keep it in a central position and to bring it to a standstill when in the lock.



Having passed through the three locks, the vessel enters Gatun Lake, converted into an artificial lake by a huge dam thrown across the Charges River, a mile and a half in length, 105 ft. in height, with a thickness of half a mile at its base, 398 ft. in width at the level of the water, and 100 ft. wide at the top. The vessel crosses this lake under its own steam for a distance of 32 miles, including the Culebra Cut of 9 miles, which gave the engineers so much trouble, not only on account of the enormous mass to be excavated, but on account of the frequent landslips. The cut has a minimum bottom width of 300 ft., with an average depth of 120 ft., the deepest part being 395 ft.

At the end of Culebra Cut the vessel enters Pedro Miguel Lock, and is dropped 30 ft., then crossing Miraflores Lake, another artificial lake, a mile and a half wide, formed by damming up the waters of smaller streams, it arrives at Miraflores Locks, and is dropped through these two locks to the sea-level. Another 8 miles completes the journey of 50 miles in all.

The locks are required, not because, as some people think, there is a difference of level between the Atlantic and the Pacific—they have exactly the same mean level—but because of the difference in the tides. The rise in tide on the Atlantic side is about 20 in., while on the Pacific side it is as many feet, due, probably, to the shape of the Bay of Panama, which being formed like a funnel tends to exaggerate the action of the tide.

On arrival at Colon, after having a look at the place and the statue of Columbus at the Atlantic entrance to the Canal, I took the train for Panama, seeing as much as I could of the Canal from the railway which crosses the Isthmus.

Arriving at Panama I took introductions to Dr. Herrick at the Ancon Hospital, who with Dr. James kindly conducted me over the institution, and I am much indebted to them for the trouble they took in showing me all their interesting cases. I noticed that in 40 per cent of their fracture cases operation was performed, and the bones either wired or a plate inserted, or both. In the evening I wandered about the city of Panama.

The next morning I took the first train as far as Miraflores, looked all over the locks there, and walked to Pedro Miguel Lock, across the bed of what will be Miraflores Lake; then walked down Culebra Cut, watching the boring for and ramming of the dynamite cartridges, retreating under cover while the charge was being fired; I also saw the steam-shovels and the track-lifters at work. I climbed out of the cut by means of a ladder fixed into the wall, and walked



back to Pedro Miguel Lock, where one of the staff kindly took me down inside the walls, and showed me the machinery for filling the locks and working the gates. The next morning I went to Gatun Locks and walked along the big dam to the spill-way.

From Colon I went to Carthagena and Puerto Columbia in South America; the former is an interesting old Spanish town, full of relics of the Inquisition.

From Puerto Columbia I went to Trinidad; took a motor and went out to see the wonderful pitch lake, which, like the "widow's cruse," never gets empty; as fast as the pitch is taken out it refills. Incidentally I saw a good deal of that picturesque island, as the lake is 60 miles from Port of Spain.

From Trinidad I went to Barbados, and then on to Cherbourg and Southampton, arriving at the latter place on September 29, just a day, within six months, from the commencement of my leave, having had a most enjoyable trip.

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## Reviews.

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**THE HYGIENIC MANAGEMENT OF LABOUR IN THE TROPICS.** By P. N. Gerrard. Singapore: Methodist Publishing House. Pp. xii and 65. Price \$2.

This book is intended for the use of planters and others concerned in the management of coolie labour in the Tropics. The author deals with the matter on severely practical lines; his writing is commendably free from technical terms, and the advice given is for the most part very sound; more especially would we commend his steady insistence on the necessity for drainage. Although the book is intended mostly for the use of laymen, it could be read with advantage, so far as the parts dealing with sanitation are concerned, by medical men also.

In addition to the paragraphs on hygiene, simple directions are given for the recognition and early treatment of the more usual tropical diseases. As a medical handbook for estate managers the book fulfils its purpose admirably.

W. S. H.

**A MANUAL OF PRACTICAL CHEMISTRY.** By A. W. Stewart, D.Sc. London: John Bale, Sons and Danielsson, Ltd. 1913. Pp. 76. Price 3s. 6d. net.

This little manual is intended for public health students, and is especially arranged for those studying for the D.P.H. examination. Without going into the details of the contents of the book we may say that it covers in a concise and clear manner practically the whole chemical work required for the D.P.H. examination. It

contains nothing irrelevant, and is evidently the outcome of much experience in teaching students.

A striking feature of the book is that the chemical equations of all the reactions employed in the various processes are given in full, an advantage which is often lost sight of in compiling text-books.

Notwithstanding our distaste for condensed "cram" books for examinations, we have no hesitation in recommending this manual to students for the Diploma in Public Health. H. B. F.

PRACTICAL BACTERIOLOGY, BLOOD WORK, AND ANIMAL PARASITOLOGY.

By E. R. Stitt, M.D., &c., U.S. Navy. H. K. Lewis, Publisher, 136, Gower Street, W.C. Pp. xv and 408. Price 6s. 6d. net.

This is the third edition of Stitt's little book, and we find in its pages ample justification for its popularity. Written by a naval surgeon for the express purpose of supplying the wants of the medical services, it combines small bulk and portability with very fair print and an enormous amount of condensed information. The text is copiously illustrated by diagrams of somewhat unequal merit; but even the worst of them is still practical and useful, and the faults are such as are incidental to limited space. We have often expressed the opinion that attempts to serve up pathology in tabloid form are better avoided, but we feel obliged to place Stitt's book in a class by itself as an example of a really successful, concentrated extract of bacteriology and parasitology. The amount of information brought into this small volume is extraordinary, and the arrangement of the material leaves nothing to be desired. It is just the book for army medical officers who desire a handy and reliable work of reference for use either at home or abroad. S. L. C.

THE ADMINISTRATIVE CONTROL OF SMALLPOX. By W. McC. Wanklyn, D.P.H. London: Longmans, Green and Co. 1913. Pp. vii and 86. Price 3s. 6d. net.

The present volume is stated by the author to be a companion to his former work on "How to Diagnose Smallpox," both having the same object, that of teaching prevention.

In these days of insufficient protection by vaccination in civil life, the possibility of a serious outbreak of smallpox is constantly before us, and a book of this description, teaching very clearly what steps the medical officer and others should take to control it, ought to be read by every medical officer of both Services.

The book is written in lecture form, and the practical detail of smallpox control is clearly laid down in an interesting and instructive manner. W. W. O. B.

A COMPENDIUM OF THE PHARMACOPŒIAS AND FORMULARIES (OFFICIAL AND UNOFFICIAL). By C. J. S. Thompson, Fellow of the Royal Society of Medicine. Fourth Edition. Pp. vi + 359. London: John Bale, Sons and Danielsson, Ltd. Price 5s.

This little book, known in former editions as "The Compendium of Medicine and Pharmacy," has now reached a fourth edition, a fact that may be accepted as continued evidence of its usefulness.

The convenient size and binding of former editions have been

retained, and the scheme of the book remains the same. A section dealing with the "Terms used in Prescriptions in Latin and English" has, however, been added.

The favourable opinion expressed in the review of the third edition can be fully endorsed, and this book will be found most useful to all medical officers as a ready and accurate means of reference. O. L. R.

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## Current Literature.

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**The Biological Diagnosis of Gonorrhœa.**—Sommer (*Archiv f. Derm. u. Syph.* Originale, November, 1913, p. 583) gives an epitome of the literature of serum, skin, and vaccination reactions in gonorrhœa, and appends a bibliography of ninety-four references.

Wildbolz and Bärmen stated that the serum of gonorrhœa patients agglutinates the gonococcus, but subsequent observers have obtained negative results only. Moreover, the serum of an animal that has been immunized with the gonococcus is not specific in its effects: it clumps staphylococci and streptococci as well as gonococci, though it does not agglutinate the meningococcus. On the other hand, an anti-meningococcic serum clumps the gonococcus.

Much work has been done on the complement deviation test in gonorrhœa. Dembska examined 100 patients and found that the serum of cases of more than a fortnight's duration deflected the complement, and in a manner especially marked if complications were present. Gardner and Clowes investigated 106 cases, and concluded that the reaction gives valuable information in gynæcology. Schwarz and McNeil find that the test is positive in all gonococcic infections, except when they are localized to the anterior urethra. The reaction is obtained usually not before the fourth week, and frequently persists seven or eight weeks or more. Of 165 cases, 13 per cent gave a positive response eight months after recovery. The complement deviation test is specific, but a negative result does not exclude gonorrhœa. The intensity of the reaction generally runs parallel with the degree and severity of the infection. v. Pirquet's reaction, in which an emulsion of dead gonococci takes the place of tuberculin, has been employed by many investigators, but the method is uncertain and of no value in the diagnosis of gonorrhœa. The intradermic reaction in which vaccine is injected into the substance of the skin, and the ophthalmo-reaction in which it is instilled into the conjunctival sac, also fail to be specific in their results.

Some observers consider that the local reaction produced at the site of inoculation after a subcutaneous or intramuscular injection of vaccine is suggestive of infection, but Sommer finds that no difference exists in the reactions seen in the infected or non-infected. On the other hand, a marked reaction of the implicated part after an injection of gonococcic vaccine is evidence in favour of the disease being due to gonococci. The reports of many investigators show that the pains in epididymitis and



gonorrhœal rheumatism are often temporarily aggravated after a dose of vaccine, or the urethral discharge is increased. Nevertheless, these reactions are not of universal occurrence; therefore, their absence does not exclude gonorrhœa. Such provocative reactions are of service in disclosing gonorrhœa which has been latent for long periods. Erlacher has reported instances in which he discovered gonococci by this method after being absent for months or years.

The occurrence of constitutional symptoms with pyrexia after inoculation with gonococcic vaccine often indicates gonorrhœa, but the absence of such a general reaction has no significance.

Sommer experimented with intravenous injections of arthigon, a gonococcic vaccine prepared by Schering, and ascertained that they are of more value than subcutaneous or intramuscular inoculations. An elevation of  $1.5^{\circ}$  C. in the temperature after an intravenous dose of 0.1 c.c. arthigon usually denotes gonorrhœa; a rise of  $2.5^{\circ}$  C. and a saddle-back course of the pyrexia are almost certainly diagnostic of the disease or of its complications.

Provocative reactions are more frequent after intravenous administration of gonococcal vaccine than after subcutaneous or intramuscular. No bad effects are caused by intravenous injections of gonococci. For women and children the dose of arthigon for intravenous administration must be less than 0.1 c.c.

Sommer is of opinion that people contemplating marriage, who believe that they have recovered from gonorrhœa, should submit to an intravenous injection of arthigon. Such a course may prevent keen disappointment in the future, and may be the means of checking much married unhappiness.

C. B.

**Antityphoid Vaccination in the French Army.**—Médecin-principal Vincent (*Archiv. Méd. Pharm. mil.*, November, 1913) published an interesting report on antityphoid vaccination in the French army during the year 1912. He employs a polyvalent vaccine, sterilized by contact with ether, and without the addition of any antiseptic to preserve it; each cubic centimetre contains 400 million bacilli. During the year 1912 30,325 men were vaccinated in France and 22,832 abroad. In very few cases was there any local reaction, and in healthy subjects pyrexia was only observed in 0.8 to 1.5 per cent of those vaccinated.

During the year 1912 the strength of non-vaccinated men serving in France was 447,159; the incidence of enteric fever among these was 2.22 per 1,000, with a death-rate of 0.3 per 1,000 of strength. At the same time there were 30,325 vaccinated men, among whom there was not a single case of enteric fever.

In Algeria and Tunisia there were 41,514 non-vaccinated men, among whom the incidence of enteric fever was 12.14, with a death-rate of 1.88 per 1,000. Among 10,031 vaccinated men living under precisely the same conditions the incidence of enteric fever was 0.9 and mortality nil per 1,000.

In Eastern Morocco the strength of non-vaccinated men was 5,807, among whom there were 222 cases of enteric fever with 32 deaths, the ratio per 1,000 being 38.22 and 5.51 respectively. In contrast to this there was not a single case among 962 vaccinated men.



In Western Morocco 6,293 non-vaccinated men had an incidence rate of 168.44 and a death-rate of 21.13 per 1,000 of strength; while among 10,794 vaccinated men the corresponding ratios were 0.18 and 0.09 respectively.

In an official communication sent to *La France Militaire*, on April 4, 1913, it was estimated that antityphoid vaccination has prevented about 2,100 cases of enteric fever, with probably 266 deaths, during the year 1912.

J. V. F.

**Intravenous Injections of Concentrated Solutions of Salvarsan and Neo-Salvarsan.**—Ravaut (*Presse Médicale*, April 3, 1913, p. 262) finding that 0.45 to 0.6 gm. of neo-salvarsan dissolved in 10 c.c. of distilled water caused no hæmolysis of human red corpuscles in vitro, has given without mishap 420 intravenous injections of such a solution. It is necessary to filter it through sterile gauze. Duhot (*Münch. med. Woch.*, May 20, 1913, p. 1088) also reports that he has administered intravenously without untoward results on 750 occasions neo-salvarsan in quantities up to 0.75 gm. dissolved in 10 c.c. of water. Katz (*Münch. med. Woch.*, October 21, 1913, p. 2337) finds that the curative effects of 0.3 to 0.6 gm. of neo-salvarsan are enhanced by dissolving it in 10 c.c. of water only. Twenty-four hours after administration no spirochaetes are found. His experience extends to 130 injections. Alexandrescu Dersca (*Münch. med. Woch.*, July 23, 1913, p. 1601) has given 40 intravenous injections of 0.39 to 0.6 gm. of neo-salvarsan dissolved in 1 to 2 c.c. of water only. He states that no after-effects were observed. Frühwald (*Münch. med. Woch.*, November 11, 1913, p. 2513) has tested Dersca's method, and has noted no bad consequences. Great care, however, must be taken to prevent these concentrated solutions escaping into the connective tissue. He also has given 259 doses of 0.6 gm. of neo-salvarsan dissolved in 10 c.c. of water, and finds that they act promptly on the treponemata. If three injections are administered in the course of ten days the patient loses all signs of the disease in a fortnight. In about two-thirds of his cases fever, headache or vomiting were observed, most frequently after the first dose.

Strong solutions of salvarsan have been employed by Stern, who dissolved 0.3 gm. in 10 c.c. of water for intravenous use. Zimmern (*Münch. med. Woch.*, May 20, 1913, p. 1087) has given 147 intravenous injections of a 5 per cent solution of salvarsan. Fever occurred twenty-seven times, and vomiting followed on thirty-nine occasions. Very painful infiltrations also were caused by inadvertently injecting a few drops of the fluid into the tissues surrounding the vein. He has discarded the use of such strong solutions, although he states that the salvarsan is retained in the body for a longer period when administered in concentrated form. Dreyfus (*Münch. med. Woch.*, October 21, 1913, p. 2333), using instead of a 5 per cent solution of salvarsan one of 1.25 per cent or less, has found in his experience of 320 intravenous injections that the after-symptoms are fewer than when the salvarsan is more highly diluted. Vomiting occurred ten times only. A complete course of salvarsan consists of 12 to 15 doses distributed over several weeks. Saalfeld (*Münch. med. Woch.*, October 21, 1913, p. 2339) has treated with good results 250 cases of syphilis with intravenous injections



of 0.3 grm. salvarsan dissolved in 40 c.c. of saline fluid. In a few instances infiltrations appeared at the site of puncture which subsided in three weeks' time or less. It appears that neo-salvarsan can be employed in higher concentration than salvarsan. If nephritis is present, both substances must be freely diluted  
C. B.

**The Re-organization of the Swiss Medical Service.** (Reviewed in Beiheft 148 zur internationalen Revue über die gesamten Armeen und Flotten).—The direction of the entire military medical service in peace and war is in the hands of the chief surgeon of the army (Oberfeldarzt). On mobilization he is the D.M.S. on the general staff, and in technical matters gives orders to the director of the territorial medical service (Territorialchefarzt). He is the technical adviser of the War Office on all questions relating to the medical services. His office is at Berne, and he is an official of the Legislative Assembly (Bund) on a fixed salary.

The medical corps (Sanitätstruppe) consists of:—

(1) Medical officers (Sanitätsoffiziere): Military surgeons, apothecaries, and quartermasters (the latter are appointed from the Quartermaster-General's Department (Heeresverwaltung)).

(2) Medical personnel: N.C.Os., lance-corporals, and orderlies (Krankenwärter).

Commissions are given only to doctors and apothecaries holding Swiss diplomas. Their position in the army is that of responsible advisers to the combatant troops, and they are under the orders of officers commanding troops. Medical officers have military and medical command of medical units. The training of the personnel is carried out at the Rekrutenschule and in the Instruktionskorps. Military instruction is given in the training corps by regular medical officers assisted by officers of other arms. The training ground of all medical units is at Basle. At the head of the training corps is the Oberfeldarzt with a staff officer (Kommandant der Sanitätsschulen).

Present establishment: 5 staff officers.  
3 captains and subalterns.  
4 assistant N.C.Os.

These officials are paid by the State, they get extra pay, according to rank, for special services, and also certain allowances (e.g., for uniform, horse, &c.).

The recruit goes first to the Rekrutenschule for sixty days; he gets the ordinary military education and is trained as a stretcher-bearer. A new manual of instruction is about to be published, the indexed outline of which appears to be on the customary lines. All medical students and apothecaries join this Rekrutenschule, and, if physically fit, are trained as officers later on.

Conditions for joining the medical corps:—

Minimum height 5 ft. 2½ in.; V = D 0.4 with the better eye; strong constitution; knowledge of reading and writing; if possible volunteers.

There is an inspection by a staff officer at the end of the course.

Officers and N.C.Os. are also trained here.

Medical students and the more educated soldiers have a more elaborate training to fit them for the duties of lance-corporal and N.C.O. This is done at the N.C.Os' school; the course lasts twenty days.

To be graded as an officer a candidate must pass the State examination, and then go through a special officer's training course, which lasts forty-five days. He is then graded as a lieutenant, and may or may not be employed with the army.

The further education of the medical orderly consists of training in a civil hospital at Geneva or Bâle for thirty days. He wears uniform and lives in barracks. N.C.Os. who have passed the Swiss State examination in medicine may be selected for study in the officers' training school by the D.M.S. The course here lasts forty-five days. The syllabus of instruction includes riding, instruction in regulations, accounts, rendering of reports, and practical acquaintance with the field equipment. The pay of mounted officers under instruction is 5 francs per diem, a travelling allowance of 5 cents per kilometre, and also a subsistence allowance. Every year there is a refresher course in different areas, lasting two weeks; this is attended by all available ranks of the regular army. It is practical training for war, and great stress is laid on its importance. The necessary transport, &c., is supplied to make the training as complete and realistic as possible.

There is a central school at Thun for officers of all arms, at which all military subjects are dealt with, including practical field work and staff rides. A certain number of medical officers attend some of these classes. There are special classes for medical officers which are called *taktisch-klinischen Kurse*. These are attended by twenty-five to thirty subaltern medical officers at a time, before promotion to captain. The instruction includes theoretical and practical military surgery, and a more elaborate study of the regulations. Medical staff rides lasting several days are carried out. A senior infantry staff officer assists in the instruction on tactics and the writing of orders. The commandant is a medical officer assisted by two others.

Mounted officers going through the course receive 7 francs per diem, travelling allowance of 10 cents per kilometre, and the regular subsistence allowance.

There is another course in tactics for senior or administrative medical officers lasting eight days; it is meant in particular for those who are about to hold important appointments during the manœuvres.

There is also a course on the duties in the home area and lines of communication, which is also attended by officers of other arms.

Strength of the medical service:—

For 1912 the strength of the medical service, including the *landwehr*, but not including voluntary aid (*Hilfstruppen*), was calculated at about 950 officers and 6,750 N.C.Os. and men. The real numbers required by law are about 1,000 officers and 8,000 N.C.Os. and men. The number of recruits for 1912 for the medical service was about 850 to 900. This was below the number required and the deficiency has been to some extent made good by training 12 to 15 handsmen per battalion in medical aid.

Mention is made of a special arrangement in the Swiss medical service with regard to the employment of civil surgeons. A certain number of medical men residing near military centres are engaged as stopgaps when for one reason or another there is shortage of military medical officers. A medical man so employed is called a *Platzarzt*. He is called upon to perform duties by the D.M.S., which also include sanitary supervision.

He usually performs his duties in mufti and is not required to go to mess.  
He receives 10 francs for each day he is employed. J. V. F.

### Reorganization of the Swiss Army Medical Establishments.—

#### NOTES ON ORGANIZATION.

An infantry battalion has 2 mounted M.Os. (bicycles if on L. of C.).  
2 medical N.C.Os.  
5 lance-corporals (Gefreiter).  
13 medical orderlies.

In addition, each company has its own medical lance-corporal.

There is a regimental medical wagon.

Mountain battalions have more medical personnel, viz. :—

Per company: 1 M.O. (one captain mounted per battalion, the other three are subalterns and unmounted).

1 medical N.C.O.  
1 „ lance-corporal.  
5 „ orderlies.

Regimental staff: 1 mounted M.O. (captain or major) with medical lance-corporal.  
Brigade transport column: 1 mounted M.O. (subaltern) with medical lance-corporal.

Bicycle companies and mitrailleur companies have each a medical lance-corporal.  
Mountain mitrailleur companies with 8 guns have a mounted M.O., 1 to 2 lance-corporals, and 4 to 5 men.

Mountain mitrailleur companies with 4 to 6 guns have 1 to 2 lance-corporals and 1 to 2 men.

The infantry mitrailleur detachment has a mounted M.O.

Squadrons, mounted mitrailleur companies, and guide detachments have each a mounted N.C.O., and a mounted M.O. with the regiment.

Artillery brigade .. ..	2 mounted M.Os.		
Artillery battery .. ..	1 lance-corporal, 2 orderlies.		
Howitzer brigade .. ..	1 mounted M.O.		
Howitzer battery .. ..	1 lance-corporal, 2 „		
Fort artillery brigade ..	2 mounted M.Os.		
Fort artillery battery ..	1 lance-corporal, 2 „		
Mountain battery .. ..	1 mounted M.O.	1 „	4 „
Infantry park company ..	1 „ „	1 corporal.	
Artillery park company ..	1 „ „	1 „	
Howitzer park company ..	1 „ „	1 „	
Mountain park company ..	1 „ „	1 „	
Pack ammunition column ..	2 mounted M.Os.	1 „	
Pack supply column .. ..	2 „ „	1 „	

#### Engineers:—

Sapper company .. ..	1 lance-corporal, 2 orderlies.
Pontoon company .. ..	1 „ 2 „
Telegraph pioneer company ..	1 „ 2 „
Mountain sapper company ..	1 mounted M.O. 1 „ 2 „
Sapper battalion .. ..	2 mounted M.Os.
Pontoon battalion .. ..	2 „ „
Divisional bridging train ..	1 lance-corporal.
Signal pioneer company ..	1 „
Helio pioneer company ..	1 „
Telegraph pioneer company ..	1 „
Balloon pioneer company ..	1 mounted M.O. 1 „ 2 orderlies.
Sapper company .. ..	1 „ 1 orderly.
Mountain supply company ..	1 „ 1 „
Sapper battalion .. ..	1 mounted M.O.
Supply company .. ..	1 lance-corporal, 1 „
Baker company .. ..	1 „
Supply column .. ..	1 M.O.
Fortress train company ..	1 „
Divisional staff .. ..	{ 1 medical staff officer 2 subaltern M.Os. 1 lance corporal.

Landwehr troops.



Extracts from para. 78 of the Swiss medical regulations :—

Before an engagement, stretcher-bearers of the infantry, jäger and schützen, four per company, assemble in rear of the battalion and then march to the infantry medical wagon. They wear the brassard. The musicians of the above as well as of foot artillery and pioneers are to be used as far as possible as supplementary stretcher-bearers. From machine guns, divisional cavalry, field and foot artillery, the extent to which men trained in first aid are to be employed as additional stretcher-bearers rests with officers commanding. If so employed they wear brassards.

The most important change in the Swiss medical organization is that in the bearer company (Sanitätskompagnie).

The companies are numbered I to VI per division; V and VI companies in the 1st, 3rd, 5th, and 6th Divisions are organized and equipped for mountain service.

Composition of a company :—

Personnel : 4 M.Os. (C.O. is a captain, mounted).  
 1 apothecary.  
 13 N.C.Os.  
 15 lance-corporals.  
 44 privates.  
 8 transport privates (including 1 N.C.O., mounted).  
 Transport : 7 wagons.  
 2 medical fourgons, A and B.  
 3 ambulance wagons.  
 1 supply and baggage wagon.  
 1 travelling kitchen.  
 Horses : 13 draught horses.

Mountain bearer company :—

Personnel : 4 officers, as in ordinary bearer company.  
 14 N.C.Os.  
 15 lance-corporals.  
 72 privates.  
 20 pack-animal conductors (including N.C.O.).  
 Transport : 20 pack animals with saddles complete.

Two mountain bearer companies form a division (Abteilung), Nos. 1, 3, 5, 6, with a staff of :—

1 staff officer.	}	Mounted.
1 quartermaster.		
1 O.C. pack animals.		
1 shoeing smith.		
4 transport privates.	}	With 8 draught horses and 2 equipped pack animals.
3 pack-animal conductors.		
1 medical fourgon, G,		
3 mounted fourgons,		

Four ordinary bearer companies constitute a division, Nos. 1, 2, 3, 4, 5, 6, with a staff of :—

1 staff officer.	}	Mounted.
1 adjutant.		
1 quartermaster.		
1 transport officer.		
1 apothecary.		
2 chaplains.		
2 medical N.C.Os.		
1 transport serjeant.		
2 shoeing smiths.		
7 transport privates.		
1 postal orderly.		
1 officer's orderly.		

Transport : 1 medical fourgon, C.  
               1 staff fourgon.  
               2 supply wagons.  
               10 draught horses.

If the mountain bearer company acts independently, as often happens, it comes under the orders of the mountain brigade staff.

The new arrangements dealt with so far are designated the first and second echelons of medical aid (Sanitätshilfslinie). The first echelon is the medical service with the troops, the second the bearer company.

The third echelon of medical assistance is composed of :—

- (1) Field hospitals (Feldlazaretten).
- (2) Hospitals on L. of C. (Etappensanitätsanstalten).
- (3) Hospitals in home territory (Territorialsanitätsanstalten).

The last two are frequently civil hospitals.

A field hospital is composed of :—

                  2 Landwehr-ambulances .. designated Nos I and II.  
 Attached are : 2 Bearer columns .. .. " " III " IV.  
                   and 2 Red Cross columns .. .. " " V " VI.

One such formation goes to each division, and they are numbered 11 to 16.

The mountain ambulances Nos. 25 to 28, are allotted to the fortress troops at St. Maurice and at the St. Gothard. Each Landwehr infantry brigade possesses a Landwehr ambulance, Nos. 19 to 24.

Landwehr ambulances, Nos. 1 and 2 :—

Detail of personnel : 6 medical officers.  
                           1 apothecary.  
                           1 accountant.  
                           6 medical N.C.Os.  
                           1 transport N.C.O.  
                           34 privates (which include 12 to 15 lance-corporals  
   and 8 transport privates).

Transport : 2 medical fourgons, A and B.  
               3 ambulance wagons.  
               1 supply wagon.  
               1 travelling kitchen.  
               2 saddle horses.  
               13 draught horses.

In the Landwehr mountain ambulance the subordinate personnel is slightly increased.

Transport : 2 medical fourgons, E and F.  
               3 ambulance wagons.  
               1 supply wagon.  
               1 travelling kitchen.

The equipment of a mountain bearer company is also included.

The horses and pack animals required are found by the fortress train companies.

Field hospitals, Nos. 11 to 16, have the following staff :—

                  1 staff officer, mounted.  
                   1 adjutant.  
                   1 apothecary.  
                   1 quartermaster.  
                   2 chaplains.  
                   4 transport privates.  
                   1 postman.  
                   1 officer's orderly.  
 Transport : 2 medical fourgons, C.  
               1 requisitioned motor wagon with 2 chauffeurs.

**Bearer column, Nos. III and IV :—**

Personnel : 3 medical officers, mounted.  
 1 transport officer, mounted.  
 1 accountant.  
 2 medical N.C.Os.  
 2 transport N.C.Os., mounted.  
 30 medical privates.  
 1 shoeing smith.  
 30 transport privates.  
 Transport : 24 hired wagons for sick.  
 2 travelling kitchens.  
 1 hired baggage wagon.  
 1 hired supply wagon.  
 54 draught horses.

**Red Cross column, Nos. V and VI, provided by the Red Cross Society :—**

Personnel : 2 medical officers, mounted.  
 40 to 60 volunteer privates.  
 Transport : 1 to 2 fourgons.  
 2 travelling kitchens.  
 24 hired wagons for sick.  
 1 hired baggage wagon.  
 1 hired supply wagon.

The commandant, line of communication, provides the necessary draught animals.

These new arrangements were tested for the first time at the autumn manœuvres in 1912, in the 5th and 6th Divisions, and the reports are said to have been very satisfactory.

There are in addition, for duty on the line of communication and in the home territory, Landwehr ambulance trains :—

Personnel : 3 officers.  
 1 accountant.  
 2 N.C.Os.  
 29 lance-corporals and privates.  
 Transport : 20 railway carriages with the necessary fittings.

Equipment for line of communication, fortress, and territorial hospitals (Anstalten) is mostly found by the Red Cross Society. J. V. F.

**Japanese Army Medical Service — Bearer Battalions** (from materials supplied by Captain A. A. McNight, Indian Medical Service). Each division has one bearer battalion. This battalion is composed of two bearer companies, two transport companies (sharyōchūtai), and a headquarter (dressing station) party. The battalion is commanded by a major or lieutenant-colonel of infantry or transport corps, and each bearer company, consisting of two bearer sections commanded by subalterns, by a captain of infantry or transport corps. It is organized for command and interior economy as a company of infantry.

The personnel of the bearer companies consists of infantry reservists, who have been trained while with the colours as auxiliary stretcher-bearers in stretcher drill and first aid to the wounded.

Each transport company is commanded by a captain of the transport corps, and consists of a transport section and an auxiliary bearer section, each commanded by a subaltern of the transport corps.



The personnel of a transport company consists of transport reservists, who are employed (1) as drivers of ambulance wagons and (2) as bearers of the auxiliary bearer section. The latter have undergone a course of stretcher drill, and are in the proportion of two men to each stretcher.

The headquarters section of the battalion consists of the commanding officer, an adjutant, an apothecary, and an accountant officer, and a dressing station party under the command of the senior medical officer. The senior medical officer is a third-class principal surgeon (major), the second senior a captain, and the remainder subalterns belonging to the active army or the reserve. The equipment consists of a number of panniers, boxes containing operating tables, field stretchers, some tents, and a proportion of ambulance wagons. All the equipment is carried on light, one-horse, two-wheeled carts: Three panniers are loaded on to each cart. They and their drivers or grooms are supplied by the transport battalion and remain with the bearer battalion during the operations.

A bearer battalion is divisible into two identical half battalions, called No. 1 half battalion and No. 2 half battalion. The panniers are in two identical sets for the purpose of division. There are two operating tables.

All the personnel of a bearer battalion, infantry, medical, or transport corps, wear the Geneva Convention brassard. The auxiliary stretcher-bearers of combatant units do not wear this brassard; they wear instead a white band on the right sleeve.

During work in the field, the bearer companies carry the wounded from the fighting line to the dressing station, in the admission section of which they deposit them, taking from there empty stretchers to carry back to the fighting line. The carriage of the wounded from one section of the dressing station to another is done by men of the medical service. The wounded are removed to the field hospitals by the ambulance wagons of the transport section and bearers of the auxiliary bearer section. The stretchers used by the auxiliary bearer section differ from those carried by the men of the bearer companies in that they are fitted with a detachable canvas hood, and with a carrying pole and detachable iron supports, which enable the bearers to carry the stretcher from the shoulders, as is done with the Indian doolie.

The dressing station party opens a dressing station (two, if the battalion is divided) about 1,000 yards behind the fighting line. A dressing station opens in four sections: (1) An admission section, (2) a treatment section, (3) an apothecary's section for the issue of materials, &c., and (4) a discharge section. These sections are partitioned off from one another by ropes, and are distinguished respectively by white, red, green, and black placards by day, and paper lanterns of the same colours by night, except that the one for the apothecary's section is white with broad bars of black. Severe cases have red, and light cases green diagnosis tallies attached to them either by their battalion medical officer or in the dressing station.

When orders are given for a whole battalion to open a dressing station, only one-half of the panniers, &c., are unloaded at first, the other half being left on the carts, so that if the dressing station should be ordered to close and re-open elsewhere, one-half of the equipment can be sent on at once to the new position. If, however, the number of wounded requires it, the second half can be unloaded and taken into use on the spot.



The Intendance Department is responsible for the cooking and latrine arrangements, this work lying outside the sphere of the bearer battalion.

J. V. F.

**The Results of Treatment of the Wounded in the Russo-Japanese War.**—Summary of an article in the *Kaikosha Kiji*, of October, 1912.

Total killed and wounded .. .. .	200,057
Proportion of killed in action .. .. .	22.8 per cent

CLASSIFICATION OF WOUNDS.

Bullet wounds .. .. .	149,040 = 79.7 per cent
Shell wounds .. .. .	31,495 = 16.9 "
Explosive wounds .. .. .	4,720 = 2.5 "
Cold steel wounds .. .. .	1,673 = 0.9 "
Proportion of wounded who died after receipt of treatment by members of the army medical service .. .. .	= 6.6 "

DEATHS AFTER TREATMENT, FROM BULLET WOUNDS.

Wounds of brain .. .. .	67.3 per cent of cases
Wounds of chest .. .. .	13.5 " "
Wounds of abdomen .. .. .	65.5 " "
Wounds of limbs .. .. .	1.9 " "

Amputations were performed in 1.1 per cent of the total number of wounded.

Infection of wounds (resulting in erysipelas, tetanus, ulcers, septicæmia, or pyæmia) occurred in 0.8 per cent of total wounded.

The proportion of men invalided from the service as the result of wounds, to the total wounded, was 13.3 per cent.

J. V. F.

**Some Medical Aspects of Aviation.**—Hermann von Schrötter has published a paper in the *Oesterreichische Sanitätswesen* (Nos. 43 and 44, 1913), entitled "Gesichtspunkte zur Hygiene und Prophylaxe der Luftfahrt: Aeronautik und Aviatik," in which he goes into some detail with regard to the physical requirements of aviators, their clothing and also into various technical matters in connexion with construction. The writer has had some personal experience of flying and has made various interesting observations on others before and immediately after flight with regard to both temperature, pulse rate and respiration. He has also endeavoured to collect facts with regard to the altitude at which the inhalation of oxygen becomes necessary. He got passengers to keep notes during flights with regard to temperature, &c., at various heights, and gives some interesting notes on their handwriting which, above a certain height (3,000 m.) becomes shaky and less legible. The cold atmosphere was in part responsible for this, but he attributes it also partly to nervous disturbances.

He is of opinion that flying men should be periodically examined to see if any organic changes are taking place. He suggests that a medical specialist should be attached to aviation commissions to deal with the many medical questions which are likely to crop up. There are points in connexion with causation of accidents in aviation which have a medical aspect.

This is a new field of work which might with advantage be taken up



by our physical training experts, and to obtain practical results, as in recent years they have done with marching, a practical course of aeronautics would appear to be indicated.

J. V. F.

**Wounds Inflicted by Falling Bullets.**—Professor Wieting Pascha of the Turkish Medical School, Gulhane (*Deutsch. Militärärztl. Zeit.*, No. 15, 1909) has described some unusual cases of bullet wounds.

During the Revolution in Constantinople the Turkish soldiers, to show their sympathy, fired off some 300,000 rounds of ball cartridge, mostly directly upwards into the air. Many of the bullets fell in the streets and inflicted a variety of wounds on persons there. Wieting discusses the possibility of these wounds having been caused by shots fired into the streets from houses, but does not believe that they could have been so caused.

The following cases were treated by him at the Gulhane hospital:—

(1) A man, aged 30, suddenly collapsed while in the street. On admission he was found to have a wound of entrance over the right parietal bone, 1 inch from the middle line, and a wound of exit over the right malar bone. He was unconscious and showed signs of cerebral compression. The wound was enlarged, many splinters of bone were removed and a plug inserted to control the hæmorrhage. At the post-mortem examination little fissuring of the skull was found; the middle meningeal artery was divided and there was a ploughed-up track through the brain substance.

(2) A boy, aged 12, suddenly collapsed while playing in the streets. He was found to have received a wound of entrance over the left parietal bone with a wound of exit just to the left of the nose. He was unconscious for several days with right-sided paresis. At the end of three weeks he was discharged cured.

(3) and (4) Two other men received wounds of the head which proved fatal immediately; no post-mortem examination was permitted.

(5) Without any warning a man was suddenly struck at the upper part of the left shoulder blade; the bullet, a Mäuser one, was found under the skin over the left breast. There were no lung symptoms.

(6) An officer was hit in the deltoid region. The bullet, a Mäuser, was found lying against the humerus.

(7) A 14-year-old boy was suddenly hit near the acromial end of the clavicle. The bullet was felt near the lower end of the ensiform process. He was unconscious and collapsed; death took place in a quarter of an hour. At the post-mortem examination the bullet track was found to have traversed the lung, pericardium, stomach, liver, small intestine and colon, and to have lodged in the right rectus muscle.

(8) A woman, aged 40, was wounded in the soft parts near the elbow joint. Judging by the shape of the wound, the bullet must have been a Martini-Henry or a Mäuser which struck broadside on.

(9) A boy, aged 4, was playing in the open when he suddenly collapsed with a scream. The wound of entrance was just under the twelfth rib to the right of the spine, the wound of exit was at the top of the thigh close to the perineal fold on the right side. The parents picked up the bullet, an unaltered Martini-Henry one, from the ground where the boy fell.

There were some abdominal symptoms, but the boy recovered completely in eighteen days.

Wieting discusses the question of ballistics in regard to the possible momentum which a bullet shot vertically into the air might be expected to possess when it again reached the earth, but has not found any satisfactory answer. He points out that all the wounds resembled in character those inflicted at long ranges.

J. V. F.

**Anti-malaria Campaign in the Adriatic Provinces of Austria.**—Dr. V. Celebrini (*Wien. med. Woch.*, No. 49, 1913) describes the anti-malaria measures carried out by direction of the Austrian Government in Dalmatia. The local conditions were such that it appeared to be wisest to direct the main effort to eliminating parasites from the blood of their human hosts and so break the cycle of infection. To accomplish this the whole adult population of the affected areas received a daily dose of 0.4 grm. of quinine from June 1 to the end of October; children according to their age received a smaller dose. Frequent blood examinations carried out during a period of several years convinced the authorities that it is only by means of a daily dose of quinine that the peripheral blood can be kept free from parasites. To ensure that every one got a daily dose of quinine required very careful administrative arrangements, as many people objected to taking quinine when not suffering from fever.

Some difficulty was experienced in getting children to take quinine, but latterly a lozenge made of cocoa and containing tannate of quinine has been found to be very satisfactory.

In many cases it has been found that quinine treatment merely has the effect of banishing the parasites from the peripheral blood, but does not eradicate them. In districts in which there were few anopheles, two years' prophylactic treatment with quinine almost banished malaria, but where anopheles were plentiful the results of the quinine prophylactic treatment were very disappointing.

Weakly, underfed persons did not tolerate quinine well, but in well-to-do individuals it appeared to have a decided tonic effect.

In making a malaria survey the only reliable index was found to be an examination of the blood; malaria parasites were frequently found in children with a normal spleen. Malignant tertian parasites were most commonly found during the late summer.

During the winter the houses in infected districts were freely fumigated, but with little result as it was found that many anopheles hibernated in shelters out of doors.

All school teachers have received a course of instruction on malaria and its prevention; it is hoped that they will impart this knowledge to the inhabitants, especially to those in remote villages.

J. V. F.

**Report on the Health of the Russian Army for 1910; issued by the Army Medical Headquarters at St. Petersburg in 1912.**—The following extracts are taken from a review on this work which appeared in the *Deutsch. Militärärztl. Zeit.*, for December, 1913.

(1) Strength of the Army Medical Establishment on January 1, 1911:—



	Medical officers	Pharmacists	Medical and pharmacist Feldschers	Company Feldschers
Authorized establishment ..	3,738	269	5,848	4,427
Actual establishment ..	3,428	265	4,919	3,958

The strength of the medical service to the rest of the army was as follows:—

1 medical officer to 358 men.  
1 pharmacist to 4,631 men.  
1 Feldscher to 138 men.

On January 1, 1911, there were in the reserve:—

5,033 medical officers.  
568 pharmacists.  
48 Feldscher officials.  
14,900 medical and pharmacist Feldshers.  
12,337 company Feldschers.

(2) The health of the army:—

The average death-rate for the preceding fifteen years was 4.15 per 1,000. The death-rate was highest in Omsk, Turkestan and Warshau.

Amongst officers the sick-rate was: 478.9 per 1,000 and the death-rate from sickness 6.9 per 1,000; from accidents, 0.63 per 1,000; and from suicide, 1.41 per 1,000.

With regard to the men, 542,410 cases of sickness occurred, exclusive of cases treated outside. Of these 31,887 were treated in regimental hospitals and 510,523 in other hospitals. In addition there were 4,608,332 outside cases treated in various institutions, necessitating 8,841,225 professional visits. These cases amount to 3,755 per 1,000 of the total strength of the army.

The total strength of the army amounted to 50,755 officers and 1,227,100 men. The average constantly sick in hospital was 28.6 per 1,000.

There was an average of 10.5 days in hospital for each man and the average number of days under treatment for each case was 23.8 days.

The following groups of diseases accounted for the largest figures in the returns, viz:—

General infectious diseases .. .. .	87,354
Venereal diseases .. .. .	56,454
Lung diseases .. .. .	60,829
Diseases of the digestive system .. .. .	55,481

Influenza, 33.5 per 1,000, and intermittent fever, 27.1 per 1,000, head the list of diseases.

Deaths occurred chiefly in the following groups:—

General infectious diseases .. .. .	2,658
Diseases of the digestive system .. .. .	374
"    "    respiratory system .. .. .	274
"    "    ear .. .. .	243
"    "    brain .. .. .	118

The death-rate was highest in typhoid fever, tubercle, and croupous pneumonia.

The engineer troops had the highest disease incidence, and the infantry the highest death-rate.

(3) Of particular diseases the following figures are of interest :—

Smallpox, 210 cases, with 29 deaths.

Measles, 182 cases. Death-rate 50 per cent. Infection was conveyed by Caucasian recruits.

Influenza is much on the increase, but would appear also to be a convenient diagnostic term for many obscure cases.

Typhoid fever: Incidence 5·2 per 1,000, death-rate 0·75 per 1,000, invalided 1·7 per 1,000. The incidence in Turkestan was 18·2 per 1,000 and in the Caucasus 11·9 per 1,000. The causation of this disease in epidemic form was attributed to bad water supply, soil infection, primitive latrines and prevalence of the disease amongst civilians.

There were 520 cases of cholera. The Caucasus, Kasan and Omsk districts had the most cases. Most cases occurred in July and August.

Tubercle of lung: 2,449 cases occurred, 649 died, 1,642 older soldiers and 848 recruits were invalided.

There was a considerable diminution in venereal disease, but the incidence is still high, viz., 47·5 per 1,000, of which 15·1 per 1,000 is due to syphilis.

The incidence in intermittent fevers and malarial cachexia shows marked improvement. While in the period 1888-1892 it stood as high as 106·5 per 1,000, it dropped to 32·4 per 1,000 in the quinquennium 1903-1907, and in the year under consideration, 1910, it stood at 28·8 per 1,000.

Amongst the accidental deaths the following figures are quoted: 32 men were killed by criminals, 26 were shot by accident, and 23 were run over; 21 died of alcoholic poisoning; 16 from carbon monoxide fumes; 12 from frost bite; 133 by drowning, of these 60 per cent were drowned while bathing, and 7·5 per cent whilst swimming horses.

The list of suicides is rather interesting. By shooting: 66 officers, 135 men. By hanging: 1 officer, 55 men. The cause of suicide was attributed amongst the officers in 16 cases to mental disturbance, and in 8 cases to alcoholism, and amongst the men in 21 cases to hopeless love affairs, in 16 to alcoholism and in 15 cases to fear of punishment.

*Invaliding.*—Thirty-three per 1,000 of older soldiers and 23·2 per 1,000 of recruits were invalided.

Amongst the older soldiers 31 per cent were invalided for anæmia and debility. Amongst the recruits the chief causes of invaliding were anæmia, bronchial troubles, heart disease, and joint and bone affections.

*Recruiting.*—According to the regulations of 1909, 10·3 per cent of recruits called up were examined, of these 43·8 per cent were passed fit, 55·8 per cent unfit, and 0·4 per cent died. Of the unfits, 32·2 per cent were remanded and 67·8 per cent were permanently dismissed.

J. V. F.

## Correspondence.

### ACTION OF SILICATES ON SNAKE-POISON.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—In connexion with a research on the action of the silicates—more especially the asbestos group of minerals and meerschaum—on various toxic substances, including snake-poison, I shall feel indebted to any of your readers who are sufficiently interested in the subject if they will kindly send me (addressed c/o The Lister Institute, Chelsea Gardens, S.W.) specimens of Indian "snake-stone" and "snake-root," varieties of which are credited with the power of counteracting the effect of snake-bite when locally applied. It would greatly facilitate matters if all available particulars were kindly forwarded with each specimen.

I am aware that the term "snake-stone" is also applied to indicate rocks with certain fanciful markings, but these, of course, are not under investigation.

I am, &c.,

MYER COPLANS.

*School of Medicine, Leeds.  
January 30, 1914.*

### NOTES FROM SIERRA LEONE.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Might I be allowed to comment upon the dismal letter from Sierra Leone? Having served at Port Lokko for seven months, at Wilberforce and Mount Aureol, I should like to say that at the first station out of seven officers and one lady we had only two mild attacks of fever. Personally, I was never sick a day, and quite 50 per cent, if not 80 per cent, of all officers were as fortunate. The determination to give up using his "flat feet," I submit, is largely to blame for the pessimistic letter. An initial dose of calomel, followed by daily exercise other than tearing off the leaves of the calendar, might be of great advantage and go far to cure his insomnia. He might try shooting (partridges and bustard), hockey at King Town, tennis, walks, &c. I do not wish in the very least to praise life in Sierra Leone, or to suggest for a moment that the service and increased pay is not richly deserved, but I do believe that, bad as it is, it is a thousand times worse to the man who takes no exercise, gives up the "flat foot" and never tries to discover any redeeming features.

I am, &c.,

JACK POWELL,

Major, R.A.M.C.,

Att. the Egyptian Army.

*Abbassia, Cairo.*

## ARMY BISCUIT ENQUIRY: SUPPLEMENTARY NOTES.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—In making the measurements of ova of *Ephestia kühniella* mentioned in the Journal of February, 1914 ("Army Biscuit Enquiry: Supplementary Notes," by J. Hartley Durrant, F.E.S., and Lt.-Col. W. W. O. Beveridge, D.S.O., R.A.M.C.), a micrometer was used which, in the absence of numbers on the scale, was thought to be graduated in tenths of a millimetre. On continuing the measurements with a fresh series of eggs and checking the results with a recently purchased micrometre scale, the instrument previously used was discovered to be in twentieths, not tenths, and the calculations have to be revised accordingly. The true measurement of the eggs is 0.58 by 0.31 mm., which lends still more point to Lt.-Col. Beveridge's conclusion that the screening of flour with a mesh of 160 strands to the inch cannot be relied on to eliminate the eggs of *Ephestia kühniella*.

I am, &amp;c.,

S. L. CUMMINS,  
Major, R.A.M.C.Royal Army Medical College,  
February 16, 1914.

Journal  
of the  
Royal Army Medical Corps.

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Original Communications.

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ANTI-TYPHOID INOCULATION.<sup>1</sup>

By COLONEL SIR WILLIAM LEISHMAN, F.R.S., K.H.P.

*Royal Army Medical Corps.*

SINCE I had the honour, in 1907, of acting as reporter on this subject at the International Congress of Hygiene, at Berlin, anti-typhoid inoculation has come to occupy a very important place in military medicine; at that time it was very far from being generally accepted as a practical measure, although its protective value was recognized by most bacteriologists. Now I think it may be said to be generally regarded as one of the most powerful weapons at our disposal in the fight against typhoid fever.

At the same time the subject has grown so large and is so many sided that it would be impossible for me to attempt to cover the whole ground, even in the way of a summary of our present knowledge, so I shall limit myself to dealing with certain points, chiefly from the military standpoint, and with special reference to our experience of the typhoid vaccine in use in the British Army.

In our army we have now accumulated a very considerable body of experience in the practical use of the vaccine. We were the first to adopt the method as a preventive measure on a large scale, and although its general acceptance has been a slow process, and it still remains on a purely voluntary basis, it is now widely taken advantage

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<sup>1</sup> Reprinted from the *Proceedings* of the International Medical Congress.

of by the soldiers, and has few, if any, strong opponents in either the combatant or the medical branches of the army. The Army Council has given every support to our endeavours to secure as many volunteers as possible.

In selecting the various points on which I shall touch, I have been specially influenced by the hope that they may give rise to expressions of the experience and the opinions of those who have knowledge of the vaccines used in other armies. The vaccine which we employ, as you are probably aware, is slightly modified from that originally devised by Sir Almroth Wright, the modifications being the result of the experiments which we have carried out with a view to the securing of better and more constant results than were obtained in the earlier days.

(1) *The Strain of the Bacillus to be employed.*—We have always adhered to the use of a strain of low virulence, but I am well aware that there are many who advocate the employment of a highly virulent strain, recently isolated from a case of typhoid fever. As far as we have been able to test this point experimentally, we have failed to convince ourselves that a vaccine prepared from a strain of high virulence creates an immunity of greater degree or of longer duration than a vaccine prepared from a strain of low virulence. It appears to us clear that virulence alone is not the important factor to be considered in the selection of the strain, but that individual strains, irrespective of their virulence, vary among themselves in respect to the degree of immunity to which they give rise on inoculation.

(2) *Polyvalent Vaccines.*—For a vaccine prepared from a mixture of several different strains of typhoid bacilli, as against a strictly monovalent vaccine, much theoretical support might be adduced; but here, again, we have not been able to convince ourselves that any practical benefit would result from a change in our custom of employing a single strain, of proved efficacy as an antigen. Our experience, which is now considerable, has shown us that the statistics demonstrating the incidence of the disease in the inoculated, as contrasted with the incidence in the non-inoculated soldiers, are of remarkable uniformity, whether they relate to typhoid fever contracted in India, in Egypt, in South Africa, or in the West Indian Islands. If there was much in this supposed need for a polyvalent vaccine, one would have expected to find marked differences in the degree to which our monovalent vaccine protected our soldiers in these widely separated countries.

(3) *The Culture Medium to be employed.*—A point in the prepara-



tion of a vaccine, which has been the subject of debate, is whether better results would not be obtained by growing the bacteria on the surface of agar instead of in peptone bouillon. It has been suggested that the toxic properties of the peptone inoculated with bouillon vaccine may in part be held responsible for the reactions which follow on the inoculations. Our experiments here have led us to the conclusion that there is no essential difference in the reaction which follows the inoculation of the same number of bacteria, in the one case suspended in the peptone bouillon in which they grew, and in the other, suspended in a neutral fluid freed from all trace of peptone. We therefore adhere to our bouillon vaccine, which presents certain technical advantages in the matter of preparation on a large scale, and we find that our reactions are in no degree excessive, nor do they appear to influence unfavourably the securing of volunteers.

Incidentally, I may add that too much importance appears to me to be attached to the attempts which have been made, by various means, to diminish or to abolish altogether the reactions following on inoculation. I believe that successful immunization by a vaccine is, almost of necessity, accompanied by a local and general reaction, and there appears to me some danger that modifications in preparation which result in an absence of reaction may lead to the production of a transitory immunity, in place of the durable one at which we should aim in military practice. However that may be, it cannot be said that it has yet been proved that the separation of the toxic element from the vaccine can be accomplished without the possibility of sacrificing an important immunizing element.

(4) *The Temperature of Sterilization of the Vaccine.* — Our vaccine has always been killed by heat, and we have found by experiment that the precise temperature employed for this purpose is a matter of great importance. If too high a temperature is employed, there results a considerable diminution of the immunizing efficacy of the vaccine. It has been suggested that this preliminary heating is unnecessary in view of the fact that we subsequently add an amount of antiseptic sufficient in itself to kill all the bacteria, and that it might be better to rely upon the bactericidal action of this antiseptic and to omit the heating. Comparative tests upon animals, however, have not shown us any evidence that such a procedure is of advantage, and I am not aware of any statistical evidence as to the greater protective value of such a vaccine. For the present, therefore, we prefer to adhere to the preliminary sterilization by means of heat.



I have reason to believe that some of the disappointing results of Wright's vaccine, in the earlier days of its employment, were due to overheating in the process of sterilization, and others to the fact that the antiseptic had been added before the vaccine had been allowed to cool; if added while hot, we found that the immunizing properties of the vaccine were seriously affected.

(5) *Standardization*.—For this we rely upon an enumeration of the number of typhoid bacteria in a given volume of the vaccine, and our dosage is fixed in terms of the number of dead bacilli injected. By the careful observance of points of detail, such as have been published in full, extremely regular results may be obtained, and judging by the uniformity of the reactions in the case of bodies of soldiers inoculated with vaccines of different dates, we feel satisfied that this method is sufficiently accurate for our purpose.

Unfortunately, as is well known, occasional individuals show a relatively high degree of sensitivity to vaccination, and there does not at present appear to be any possibility of detecting such sensitive subjects prior to inoculation. Previous analytical tests of their blood might conceivably do so, but such tests are, of course, out of the question as a practical measure. The reasons for this sensitivity are far from clear, and I shall only say in connexion with this subject that I have knowledge of a certain number of cases in which men who had exhibited such reactions have contracted typhoid fever within two years and suffered from severe attacks: one such case recovered from a severe attack, but about three years later he had another attack from which he nearly died. Such cases have suggested to me that individuals who show themselves hypersensitive to inoculation are unlikely to develop a satisfactory immunity to subsequent infection.

(6) *The Keeping Properties of the Vaccine*.—It has been necessary for us to study this question closely, since, under the conditions prevailing in the British Army, we have to send our vaccine to many parts of the Tropics, and in some cases a considerable time must elapse between its preparation and its employment. The increase in the number of well-equipped laboratories in our tropical stations would, of course, permit of the local manufacture of the vaccine in many places, but there are advantages attaching to its preparation at one central institute which, in our opinion, outweigh the disadvantages. We have found that if kept in the dark in hermetically sealed glass phials, and not exposed to a heat greater than the shade temperature of the locality, the vaccine

will retain its efficacy unimpaired for several months. Little, if any, change can be detected in its immunizing properties even after storage at a tropical temperature for six months. To be on the safe side, however, we do not use any vaccine of greater age than three months; after this period it is destroyed and replaced by fresh material. The needs of our tropical stations are readily supplied by sending them regular supplies once or twice a month, and of course any urgent need can be cabled.

In connexion with this subject we have also found that it is well not to employ a vaccine too soon after its preparation, since if it is inoculated within ten days of this, unduly severe reactions sometimes result.

(7) *Dosage*.—We still adhere to the dosage upon which we fixed seven years ago, giving to such men as volunteer two doses at an interval of ten days, the first containing 500 million and the second 1,000 million dead typhoid bacteria. As to the amount of each dose, it is difficult to compare this with the dosage of the vaccines in use in other countries, owing to the different methods employed in standardization, but I believe there is no very great difference in this respect. In other systems, however, a greater number of doses is given, three or even more. There are reasons peculiar to our army which would render difficult any increase above the two doses which we employ, at all events as long as it remains upon a voluntary basis. If we were to insist upon three doses being given at present, I feel sure that we should lose a large number of volunteers. We should not, however, allow this consideration to stand in our way if evidence was forthcoming that the immunity produced by our system was distinctly of lower order, either in respect of degree or duration, than that produced by a larger number of doses. We have no such evidence ourselves, and it is naturally difficult to draw any definite conclusions from the experience of other armies, in which both the vaccine and the number of doses are different from ours.

On the question of the reactions which result from the above dosage of our vaccine I need only say a word or two, since they have been frequently described. In the large majority of instances they are quite moderate, and I am convinced that they have no appreciable effect in discouraging men from volunteering for inoculation. No doubt it would be a boon if we were able to immunize our soldiers against typhoid without causing them to be partially incapacitated for twenty-four or forty-eight hours from doing their full duty, and further progress in bacteriology may



teach us how to secure this without the danger of sacrificing some portion of the immunizing efficiency of the vaccine. This danger I have already alluded to, and I think it is one which we must keep in view when it is claimed for a new vaccine that it gives rise to little or no reaction. From a military point of view, however, we must all be agreed that such a reactionless vaccine would possess an indisputable advantage, even if it were accompanied by some small loss in the duration of the immunity to which it gave rise, namely, that we should then be able to inoculate soldiers, at all events with a single dose, on mobilization, without any fear of a certain proportion of them being unable to carry out their full duties for one, or possibly for two days.

(8) *The Duration of the Immunity.*—It is and it must remain a matter of great difficulty to ascertain how long an inoculated person preserves the protection he has acquired. It appears to me that there is only one test which could be regarded as conclusive evidence upon this point, namely, the statistical proof of the degree of protection against actual infection of a large body of men, properly controlled by a similar body of uninoculated men, the whole being kept under observation for the same period and exposed to the same risks of infection throughout. Such a test, at all events in our army, is almost impossible of realization, since the personnel of a regiment changes so rapidly that after two years, the period beyond which we wish for more precise information, the statistics would have become so complicated as to be almost impossible of interpretation. So far as I have been able to collect information upon this point, I have come to the conclusion that in the great majority of cases little or no protection remains after a lapse of two years from the date of inoculation of a double dose of our vaccine.

The alternative method of estimating the quantity of immune substances in the blood has obvious limitations. Our tests are rough, at the best, and it is by no means to be taken for granted that the absence of agglutinins, or the finding of no more than a normal amount of specific bacteriolysins or opsonins, is to be regarded as evidence that the inoculated person has therefore lost the whole of the increased resistance conferred by his inoculation. For example, although it is exceptional to find any evidence of a raised titre of immune substances nine or twelve months after inoculation, we possess definite statistical evidence that the majority of the inoculated retain an increased resistance to infection up to eighteen months or two years.



On the whole, I regard the average duration of the protection conferred by our system as two years, and I think that after this time has elapsed, the individual, if still exposed to the danger of infection, should be re-inoculated. With regard to re-inoculation I am inclined to believe that a single dose of 1,000 million bacteria will suffice, and that it is unnecessary in this instance to insist upon two doses. At the same time, although I have no reason to think this quantity insufficient, I have not as much information upon this point as I should like.

(9) *The "Negative Phase."*—At the Berlin Congress I spent some time in giving reasons for my belief that the dangers of this negative phase had been exaggerated. I need only add that, since that time, I am more than ever convinced that, with the dosage we employ, there is nothing to fear in the way of an increased susceptibility during the days immediately following on inoculation. For some years our soldiers have been freely inoculated in tropical stations in which typhoid fever is endemic, and even in the presence of the disease in severe epidemic form; in spite of this, no evidence has reached me of such increased susceptibility among the freshly inoculated. Now and again it happens, as it is bound to happen, that a soldier has been inoculated within the limits of the incubation period of the disease; in such of these cases as I have received particulars of, I have not remarked any exceptional severity of the subsequent attack of typhoid, indeed, a number of them ran an unusually short course, during which the patient was at no time seriously ill. If further evidence were wanted upon this point, I need only point to the increasing use of typhoid vaccines in the therapy of typhoid fever, and to the large doses of vaccine—up to 250 millions—which may be given to cases of typhoid fever with nothing but good results. Cases, too, have recently been recorded in which infections contracted accidentally in the laboratory have been promptly and continuously treated by vaccine and have not developed typhoid fever.

(10) *The Paratyphoid Problem.*—To my mind the possible advantage which might result from the employment of a "mixed" vaccine of typhoid and paratyphoid bacilli is a more important question than that of the advantage of a polyvalent vaccine, with which I have already dealt. In our foreign stations, notably in India, it has become increasingly evident that there exists a considerable amount of paratyphoid fever, due in almost all cases to *B. paratyphosus* A. These infections figure more largely in our returns for the last few years, but it is very doubtful whether this



indicates any increase in prevalence, since our knowledge of the bacteriological tests by which these bacilli may be differentiated from the typhoid bacillus is of recent date. Almost every case of continued fever is now tested most thoroughly, and bacteriological examinations of the blood and excretions are a matter of routine practice. It is natural, therefore, that the number of paratyphoid infections should show an apparent increase, as compared with the years in which these tests were less generally used. It is true that these paratyphoid infections are on the whole milder than typhoid fever; for instance, out of 168 cases which occurred in India in the last two years, all of them identified by the isolation of the bacillus, only four were fatal; still, they lead to considerable disability among the soldiers, and we have therefore to take them into account almost as seriously as true typhoid.

Our laboratory experiments have shown us that inoculation with our typhoid vaccine does not call forth any antibodies to paratyphoid bacilli, and this has been fully borne out by statistical information (see Table III), so we may conclude definitely that typhoid vaccine does not protect against paratyphoid fever. In other armies it may be that paratyphoid fever is so rare that it is not an important question, but with us it has come to be so, and we are engaged at the present moment in investigating the possibility of preparing a mixed vaccine which shall protect the soldier against both diseases. The problem is not an easy one, but we hope to overcome the difficulties which we encountered and, eventually, to substitute for our present one a mixed typhoid and paratyphoid vaccine.

(11) *Sensitized and Living Vaccines.*—I have no personal experience in connexion with this interesting and important development of bacterial vaccines, whether employed therapeutically or prophylactically. Their use in connexion with large bodies of soldiers does not appear to me to be quite free from danger, but I am looking forward to hearing more about their military application from some of our visitors who have such personal experience. I confess to feeling some doubts, also, as to the durability of an immunity which is established with the rapidity and freedom from reaction which is claimed for such vaccines.

(12) *The Results of Anti-typhoid Inoculation.*—As regards our recent results, I may call your attention to the tables I have drawn up. Table I refers to the "Test-unit" experiment, of which the full details have recently been made public in the Report of the Anti-typhoid Committee. I venture to believe that the results of this experiment furnish conclusive evidence of the protective power



of anti-typhoid vaccine, and I would refer any who may be interested to the Report I have mentioned for my reasons in holding this belief. It is true that this experiment was concluded some years ago, and I should have liked to be able to show you our more recent results compiled upon the same plan. I am both glad and sorry that I am unable to do so, sorry on account of lack of uniformity in the methods, but glad because of the reason, which is that we have now in India so large a proportion of inoculated men that the earlier method is inapplicable.

In Table II, I have shown the official figures relating to the incidence and mortality from typhoid fever in the British troops in India for the last twenty-three years, and that you may more readily appreciate them, I have constructed a chart<sup>1</sup> showing the fluctuations in the figures in graphic form. The three curves shown in the chart represent, respectively, the total number of admissions, the total number of deaths, and the ratio of admissions per 1,000 of strength. The scales have been arranged so as to bring the curves into the same field. I have no time to discuss these figures in detail, and will only call your attention to the following points:—

(a) The sharp rise in all the curves for the years 1897 and 1898 synchronized with a series of expeditions on the North-west Frontier of India, and is, I think, undoubtedly connected with this.

(b) This rise was followed in the years 1899-1901 by an equally pronounced fall, readily explained by the removal of a considerable portion of the Indian garrison to the South African War, and by the fact that during this period there were no drafts of non-immune young soldiers landing in India. On the restoration of normal conditions, in the year 1902, the curves, as you see, rise once more nearly to their former levels.

(c) Anti-typhoid inoculation was re-introduced, as a voluntary measure, in the year 1905, but it was not until the year 1909 that the number of men inoculated became sufficiently large to influence the general statistics, assuming that the men were protected by its use. From that year you will see that there has been a steady and very remarkable decline, the figures for each successive year constituting a fresh low record, until in 1912 we find that there have only been 118 cases of typhoid fever in the whole of the British Army in India, a gratifying contrast to the large figures recorded in the past.

<sup>1</sup> Not reproduced in the *Proceedings*.



TABLE I.—INCIDENCE OF TYPHOID FEVER IN TWENTY-FOUR "TEST-UNITS."

Unit	Last station of unit	Date of arrival at last foreign station	Date of latest report	Total period under observation Yrs. Mos.	Total strength of unit		Inoculated strength—Enteric				Uninoculated strength—Enteric				Case incidence per 1,000		Case mortality per 100	
					On arrival at last foreign station	At date of last report	On arrival at last foreign station	At date of last report	Total cases	Total deaths	On arrival at last foreign station	At date of last report	Total cases	Total deaths	Inoculated	Uninoculated	Inoculated	Uninoculated
1. 2nd Rl. Fusrs. ..	Secunderabad	Dec., 1904	June, 1908	3 6	883	1,013	106	198	12	1	777	815	68	9	60	83	8.3	13.2
2. 17th Lancers ..	Meerut	Oct., 1905	Aug., 1909	3 10	576	620	130	460	18	2	446	160	96	18	39.1	11.1	18.7	18.7
3. 12th Bde. R.H.A.	Sialkot	Dec., 1905	July, 1908	2 7	356	330	46	202	0	0	310	128	7	1	Nil	Nil	14.2	14.2
4. 14th Hussars ..	Bangalore	Sept., 1906	July, 1909	2 10	599	634	211	377	4	1	388	257	6	2	10.6	54.6	25	33.3
5. 3rd Cold. Gds. ..	Khartoum	Oct., 1906	Aug., 1909	2 10	708	754	90	540	2	0	618	214	10	1	3.7	46.7	Nil	10
6. 2nd Leicesters ..	Belgaum	Oct., 1906	July, 1909	2 9	938	910	149	589	5	1	789	921	24	3	8.4	74.7	20	12.5
7. 2nd Dorsets ..	Madras	Nov., 1906	June, 1909	2 7	1,058	1,108	62	311	1	0	996	797	12	2	3.2	15	Nil	16.6
8. 1st Conn. Rangers	Dagshai	Mar., 1907	July, 1909	2 4	485	1,006	300	611	0	0	185	395	7	2	Nil	17.5	28.5	28.5
9. 2nd Bedford's ..	Gibraltar	Sept., 1907	June, 1909	1 9	887	927	294	309	0	0	593	618	7	1	8.5	11.3	14.2	14.2
10. 13th Bde. R.H.A.	Pretoria	Oct., 1907	July, 1909	1 9	363	354	240	235	2	0	123	119	6	0	Nil	50.4	Nil	Nil
11. 1st Suffolks ..	Malta	Nov., 1907	June, 1909	1 7	890	926	391	412	0	0	499	514	0	0	6.1	Nil	50	50
12. 1st Dgn. Gds. ..	Amballa	Dec., 1907	June, 1909	1 6	645	620	230	485	3	0	425	135	2	1	2.2	14.8	Nil	Nil
13. 1st Lan. Fusrs. ..	Meerut	Dec., 1907	July, 1909	1 7	999	959	716	890	2	0	283	69	0	0	Nil	7	Nil	Nil
14. 3rd Worcesters ..	Wynberg	Dec., 1907	Sept., 1908	9	635	633	206	209	0	0	429	424	3	0	Nil	7.7	33.3	33.3
15. 1st Yorkshires ..	Alexandria	Jan., 1908	July, 1909	1 6	843	847	439	460	0	0	404	387	3	1	Nil	Nil	100	100
16. 3rd K. R. Rifles ..	Crete	Feb., 1908	June, 1909	1 4	880	928	177	217	0	0	703	711	0	0	Nil	7.7	Nil	Nil
17. 7th Dgn. Gds. ..	Cairo	Sept., 1908	June, 1909	9	575	561	171	242	0	0	404	319	1	1	Nil	3.1	Nil	Nil
18. 6th Innis. Dgns. ..	Mhow	Oct., 1908	July, 1909	9	605	605	397	547	0	0	208	58	0	0	Nil	1.7	Nil	Nil
19. 1st Borderers ..	Wellington	Oct., 1908	July, 1909	9	998	990	301	422	0	0	697	568	1	0	Nil	8.2	20	20
20. 2nd Somerset L.I.	Malta	Nov., 1908	June, 1909	7	869	890	233	285	0	0	586	605	5	1	4.3	119.5	27.2	27.2
21. 4th Worcesters ..	Bareilly	Nov., 1908	July, 1909	8	1,004	1,004	601	912	4	0	403	92	11	3	3.2	Nil	Nil	Nil
22. 2nd Liverpools ..	Sabathu	Jan., 1909	July, 1909	6	922	909	471	510	2	0	451	399	0	0	Nil	1.5	Nil	Nil
23. 2nd Devonshires ..	Crete	Jan., 1909	June, 1909	5	855	905	253	253	0	0	602	652	1	0	Nil	11.1	Nil	Nil
24. 1st Rl. Scots ..	Ranikhet	Feb., 1909	June, 1909	4	910	881	561	702	1	0	349	172	2	0	1.4	Nil	Nil	Nil
Average				1 8	18,488	19,514	6,815	10,378	56	5	11,668	8,936	272	46	5.39 ±0.48	30.4 ±1.2	8.9	16.9



Those of us who have been responsible for inoculation have always owned in the fullest manner that vaccine has not been the sole factor in this remarkable change. Improvements in general sanitation, improved methods of diagnosis, the detection and isolation of "carriers," have undoubtedly all played a part; but my strong personal conviction, shared, I am glad to know, by many of my brother officers, is that the reduction is in the main due to the extended employment of anti-typhoid vaccine.

TABLE II.—TYPHOID FEVER IN INDIA FROM 1890 TO 1912.

Year	Admissions	Deaths	Admissions per 1,000 of strength	Case mortality per 100
1890	1,253	332	18·6	26·50
1891	1,343	380	20·3	28·29
1892	1,506	374	22·1	24·83
1893	1,402	370	20·1	26·39
1894	1,486	408	20·9	27·49
1895	1,544	383	22·6	24·81
1896	1,795	445	25·5	24·79
1897	2,050	556	31·8	27·12
1898	2,375	657	36·3	27·66
1899	1,392	348	20·6	25·00
1900	970	289	16·0	29·79
1901	776	202	12·8	26·03
1902	1,012	260	16·7	25·69
1903	1,366	292	19·6	21·38
1904	1,384	265	19·7	19·15
1905	1,146	213	16·1	18·59
1906	1,095	224	15·6	20·46
1907	910	192	13·1	21·10
1908	998	191	14·6	19·14
1909	616	112	8·0	18·18
1910	296	45	4·1	15·20
1911	170	22	2·3	12·9
1912	118	26	1·7	19·0

Table II and the chart of the incidence in India do not, however, take into account two important points, the relative incidence in the inoculated and the non-inoculated and the amount of paratyphoid fever. I have therefore drawn up Table III, in which you will find detailed information upon these points for the years 1911 and 1912. Prior to 1911 paratyphoid fever was included with typhoid fever under the general designation "enterica."

As regards the relative incidence in the inoculated and non-inoculated, Table III bears out fully the high protective influence demonstrated in Table I. The figures speak for themselves, and I shall only call your attention to two special points. First, you

must bear in mind that we are no longer dealing with groups of approximately the same size, but that the percentage of inoculated men has reached, in 1912, the high level of 90 per cent. Secondly, I have reason to believe that the figures, good as they are, considerably underestimate the protective value of the vaccine, because the official returns take no account of the fact that a large proportion of the men, recorded simply as inoculated, had received their injections more than two years before. As I have already mentioned, I do not regard such men, unless re-inoculated, as being effectively immunized.

TABLE III.—INCIDENCE AND MORTALITY OF TYPHOID AND PARATYPHOID FEVER IN INDIA IN INOCULATED AND NON-INOCULATED SOLDIERS, 1911 AND 1912.

	1911	1912
Percentage of soldiers inoculated .. .. .	85 %	90 %
<b>TYPHOID FEVER.</b>		
Total admissions:		
Inoculated.. .. .	106	78
Non-inoculated .. .. .	64	40
Ratio of admissions per 1,000 of strength:		
Inoculated.. .. .	1·7	1·2
Non-inoculated .. .. .	5·9	5·6
Total deaths:		
Inoculated.. .. .	11	10
Non-inoculated .. .. .	11	16
Ratio of deaths per 1,000 of strength:		
Inoculated.. .. .	0·17	0·16
Non-inoculated .. .. .	1·15	2·25
Case mortality:		
Inoculated.. .. .	10·37 %	12·8 %
Non-inoculated .. .. .	17·18 %	40·0 %
<b>PARATYPHOID FEVER.</b>		
Total admissions .. .. .	104	64
Total deaths .. .. .	2	2
<i>B. paratyphosus</i> A isolated .. .. .	103	60
<i>B. paratyphosus</i> B isolated .. .. .	1	4
Total number inoculated with anti-typhoid vaccine .. .. .	97	63

Paratyphoid fever, until the last two years, has not been separately dealt with in the returns, and the figures which I am able to give you will be of interest. The chief points are the low mortality, the great preponderance of the strain "A," and the statistical proof of the fact, on which I have already spoken, that typhoid vaccine has no protective influence against paratyphoid infection.

In conclusion, gentlemen, I submit to you, as representing the

medical departments of the armies of the world, that the time is past when the protective power of anti-typhoid vaccine could be regarded as a matter for debate or controversy. It has made its proofs, and is, I think, worthy of general acceptance as the strongest weapon with which we can fight this deadly scourge of armies in the field. I admit freely that we may not yet possess the ideal vaccine; that, however, is a problem for the bacteriologists and will no doubt be solved in time, but I urge that since we are already in possession of several vaccines of proved efficacy, we should do all in our power to secure that it be brought into universal use for *all* soldiers who may be exposed to the danger of infection in peace or war. To my mind it should no longer be left to the individual soldier to say whether he wishes to be inoculated, or whether he prefers to run the risk of spreading infection widecast among his comrades at a time when every rifle taken from the firing-line may be a matter of importance to his country.

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EXPERIMENTAL TYPHOID INFECTIONS IN THE  
RABBIT.

BY MAJOR S. L. CUMMINS AND MAJOR C. C. CUMMING.

*Royal Army Medical Corps.*

IN the *Journal of Medical Research*, vol. xxvii, No. II, p. 177 (November, 1912), an interesting and important paper appeared by Dr. J. A. Johnston on the treatment of the "typhoid carrier state" in the rabbit by inoculations with an anti-typhoid vaccine. The animals used in the experiment were infected by inoculation with 0.5 c.c. of an emulsion of one agar slope of *Bacillus typhosus*, given intravenously.

Certain of these rabbits were left untreated as "controls," while others were treated by the inoculation of a dose of killed anti-typhoid emulsion administered from thirty-six to forty-eight days after the preliminary infecting inoculation.

The animals were chloroformed at stated intervals and the blood and the organs examined by cultural methods for the presence of *B. typhosus*. The experiments appeared to indicate some beneficial effect following the vaccine treatment, since out of seven rabbits so treated *B. typhosus* could only be recovered from two, while out of eleven untreated animals it was recovered from ten.

A further observation of great interest was recorded by Dr. Johnston to the effect that, several days after the preliminary septicæmia resulting from the intravenous inoculation had passed off, the typhoid bacilli reappeared in the blood and could be isolated therefrom, positive results being obtained from the heart blood in animals killed at dates varying from seven to thirty days after inoculation. The importance of this result, as offering a possible line of research in the pathogenesis of typhoid fever, appeared to us to be very great, and we decided to carry out a series of experiments with the object of confirming, if possible, Dr. Johnston's work. At the same time we decided to try the effect of a preliminary anti-typhoid inoculation in a certain number of animals in order to ascertain whether any prophylactic action, as opposed to the therapeutic action investigated by Dr. Johnston, could be demonstrated.

## EXPERIMENTS.

Ten rabbits of approximately equal weight and age were selected, numbered from 1 to 10, and divided into two groups.

Group 1, consisting of rabbits Nos. 1 to 5, was treated as follows :—

On January 20, 1913, each rabbit was inoculated with 50 million killed typhoid bacilli.

On January 30, 1913, each rabbit received a second dose of 100 million bacilli.

Group 2, consisting of rabbits Nos. 6 to 10, was left untreated.

On February 4, 1913, the pooled serum of Group 1 was found to agglutinate *B. typhosus* up to a dilution of 1 in 300.

Thermostable opsonins, calculated by the dilution method, were as follows :—

Serum dilutions :		$\frac{1}{2}$		$\frac{1}{4}$		$\frac{1}{8}$		$\frac{1}{16}$		$\frac{1}{32}$
Group 1	..	169	..	38	..	22	..	24	..	2
Control	..	47	..	1	..	1	..	0	..	—

The numbers refer to the number of bacilli counted in 50 phagocytes.

It was recognized that, in order to produce a degree of immunity corresponding to that following anti-typhoid inoculations in man, larger doses would have to be given, but owing to pressure of other work it was decided to continue the experiment without further loss of time.

At noon on February 13, 1913, all the rabbits of both groups were given an intravenous inoculation of 0.5 c.c. of an agar culture of *B. typhosus* (Eyre) which had been emulsified in 5 c.c. of normal saline.

Blood cultures from an ear vein of each rabbit were made at 3 p.m. on February 13, 14, 15, 17, and 18, and subsequently twice weekly.

The fæces of each rabbit were emulsified and plated once a week from February 25 onwards. Two rabbits (one from each group) were chloroformed and examined post mortem, by culture and otherwise, each week from March 3 onwards. The method employed for making cultures from the viscera was as follows: The whole spleen, kidney, or gall-bladder (less such portions as were used for sections), and a whole lobe or more of the liver, were removed in turn with sterile precautions, dipped in spirit and "flamed" to kill any superficial contamination, placed in a sterile glass mortar and pounded up with sterile solution of sodium taurocholate in distilled water (0.5 per cent), the whole contents of the mortar being then transferred to a flask and incubated. We desire to lay stress on this method as it is much more likely to afford a positive result than the method usually adopted of cutting



into the viscus, and removing a loopful of such tissue and blood as is obtainable in the incision. The temperatures of the individual rabbits were taken once daily up to February 17, and twice daily from that onwards in the hope of eliciting the occurrence of pyrexia in association with any secondary septicæmia that might develop. As a control the temperature of three normal rabbits was also observed at the same time. The main points observed in the case of each rabbit will now be recorded in order.

*Rabbit 1.*—Beyond the initial rise for forty-eight hours after inoculation and the fall on the third day, the temperature showed no marked disturbance. The animal remained in good health up to March 4 (the nineteenth day after the inoculation), when it was chloroformed. On no occasion was *B. typhosus* isolated from the fæces during life.

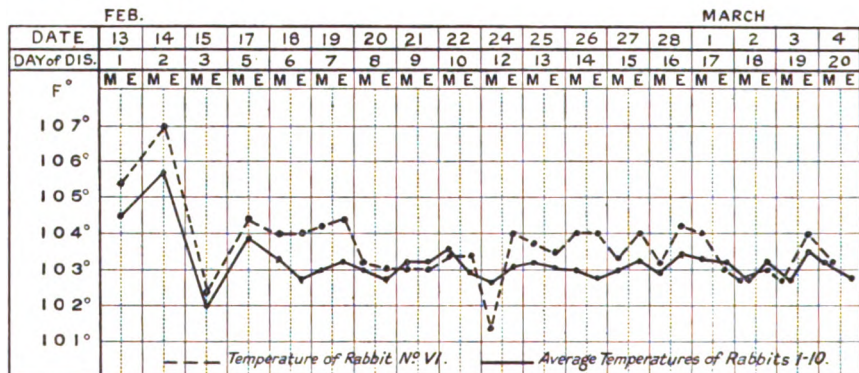


Chart comparing the temperature of Rabbit VI with the average temperature of the whole series of ten animals.

*Post-mortem.*—The heart's blood, spleen, bile, gall-bladder, and the contents of the small intestine were all negative as regards the isolation of *B. typhosus*. This bacillus was, however, isolated in pure culture from the pounded-up substance of the liver. Blood culture was positive on February 13, 14, and 15, after which it was always negative.

*Rabbit 6.*—This rabbit was distinctly affected by the inoculation, the temperature rising to 107° F. on the day following inoculation, and reaching 104° F. or upwards in 13 out of 31 observations.

(On no occasion did the average temperature of the three control rabbits reach 104° F.)

Blood culture was positive on February 13, 14, and 15, negative on 17, 18, and 20, positive again on February 24 (the eleventh



day), negative on February 27 and March 3. The strain isolated on February 24 was only agglutinated with great difficulty and incompletely after three hours by an anti-typhoid serum in a dilution of 1 in 500. The normal titre of this serum was up to 1 in 10,000. Culturally the bacillus was typical *B. typhosus*. It is of interest to note that the strain used for the intravenous inoculation was easily agglutinated by this serum, and it seems that this strain must have acquired, within the animal, relatively serum-fast properties.

The serum of Rabbit 6 tested on March 3 agglutinated *B. typhosus* (Eyre) up to a dilution of 1 in 1,000. *B. typhosus* was never isolated from the fæces of this animal. The rabbit was chloroformed on March 4, the nineteenth day after inoculation.

*Post-mortem.*—The heart's blood, bile, gall-bladder, and the contents of the small intestine were all culturally negative for *B. typhosus*. This organism was, however, isolated from the spleen and the liver in pure culture. The strains isolated from these organs were agglutinated with comparative ease by the anti-typhoid serum before mentioned. It is to be noted that this rabbit was the only one of the series to show a continued modification of the temperature, the only one in which a secondary septicæmia occurred, and the only one in which the spleen gave a positive culture.

*Rabbit 2.*—*B. typhosus* was isolated from the blood on the day of inoculation only. Subsequently to the three days' rise following the inoculation, which was noted in most of the animals, this rabbit twice showed a temperature of 104° F. or over (on February 22 and 25). On no occasion was *B. typhosus* isolated from the fæces. When the rabbit was chloroformed on March 12 cultures from the heart's blood, spleen, liver, gall-bladder, bile, contents of small intestine, urine, and kidney were all negative as regards *B. typhosus*.

*Rabbit 7.*—In all essentials this rabbit gave results similar to Rabbit 2. It was chloroformed on the same date, March 12, 1913, and as in the case of Rabbit 2, *B. typhosus* could not be isolated.

For the reason that they showed excretal evidence of infection, it was thought desirable to chloroform Rabbits 4 and 9 out of their turn, in order to ascertain as far as possible on what pathological condition the excretion of bacilli depended.

*Rabbit 4.*—*B. typhosus* was isolated from the blood on the day of inoculation and again on February 15 (forty-eight hours after inoculation). In all subsequent cultures the blood was found negative.



After the preliminary pyrexia, the temperature reached 104 F.° on two occasions only (March 25 and April 1). *B. typhosus* was isolated from the fæces on March 11 (twenty-six days after inoculation). The animal was chloroformed and examined on March 19. *B. typhosus* was present in cultures from the liver and from the contents of the small intestine. Cultures from the heart's blood, spleen, gall-bladder, and bile were all negative.

On examining sections of the gall-bladder, large agglomerations of gram-negative bacilli were found close to the walls, while the epithelium was degenerated and the more superficial cells of the gall-bladder wall, those immediately under the epithelial lining, were found to show intense pyknosis of their nuclei. It is difficult to explain why the gall-bladder wall and the bile gave a negative result in culture unless some error occurred in our technique or the bacilli were dead. The isolation of living *B. typhosus* from the contents of the duodenum, these having presumably reached their situation by the bile, points to the former as the more probable explanation. Sections of the liver showed marked fatty degeneration of the liver cells.

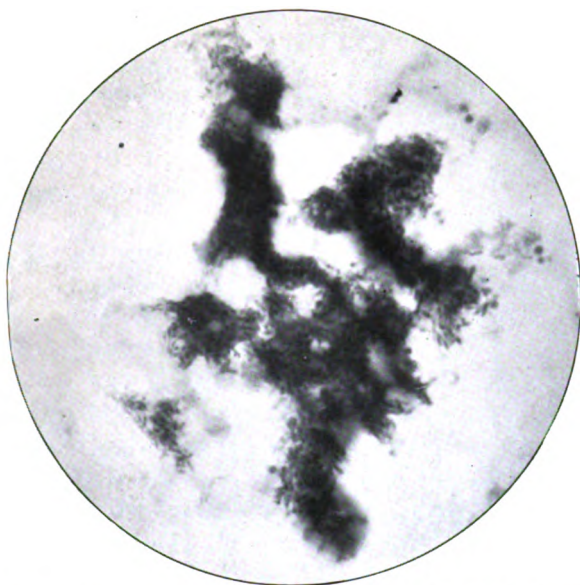
*Rabbit 9.*—*B. typhosus* was isolated from the blood on the day of inoculation, on February 14 and 17 (twenty-four and ninety-six hours after inoculation). On all subsequent cultures the blood was found negative. The temperature after the usual preliminary rise never attained 104° F. on any subsequent date. *B. typhosus* was isolated from the fæces on February 25 (twelve days after inoculation). The fæces were negative on March 4, 11, and 19.

The rabbit was chloroformed on March 19, and the usual post-mortem examination made.

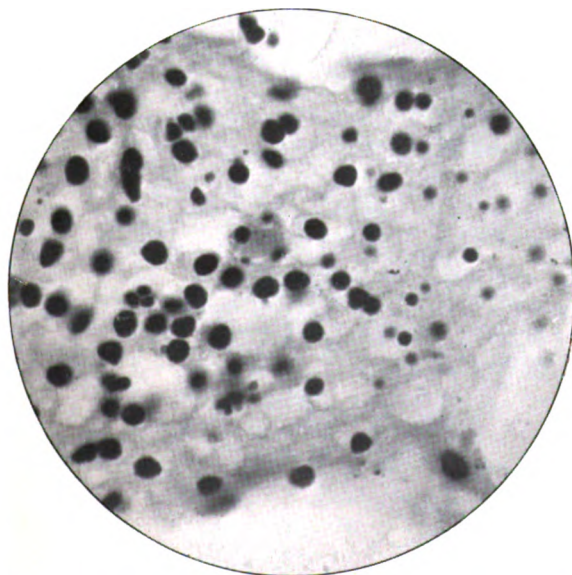
*B. typhosus* was isolated from the liver, the gall-bladder, and the bile in pure culture. The heart's blood, spleen, and the contents of the small intestine were negative.

Sections of the gall-bladder showed appearances exactly similar to those already described in Rabbit 4. Liver sections showed intense fatty degeneration of the liver cells. In neither Rabbit 4 nor Rabbit 9 were we able to find bacilli in the sections of the liver, although both livers gave a positive result on culture.

*Rabbits 3 and 8* were chloroformed and examined on March 25, and *Rabbits 5 and 10* on April 3. All of these rabbits gave positive blood cultures on the day of inoculation, and twenty-four hours later. In none of them was *B. typhosus* isolated from the blood on any subsequent date, though attempts at culture were continued in all of them up to the date of post-mortem. In no case



Clump of typhoid Bacilli in the gall-bladder of rabbit 9 (Leishman's stain).



Portion of the gall-bladder wall of rabbit 9 showing pyknotic changes in the nuclei (Weigert's and Van Gieson's stain).



was *B. typhosus* isolated from the faeces of these animals, nor did any of them give a positive culture from tissues or organs on post-mortem examination.

On May 1, 1913, two more rabbits were inoculated intravenously with *B. typhosus*, "G. Ford," a strain isolated a year previously from an acute case, and kept in an agar "stab," without subculture since the date of its verification by cultural and serological tests. Of these two, Rabbit A was chloroformed on May 29, and the usual post-mortem carried out, followed by cultures from the tissues and organs. *B. typhosus* was isolated, together with a large non-motile gram-negative bacillus, from the liver. The spleen, kidney, gall-bladder, bile, and heart's blood were all negative, and no bacilli could be found in sections of the gall-bladder.

Rabbit B was similarly treated a week later, June 5, with entirely negative results.

The results of the above experiments may be summarized as follows:—

#### COMPARISON OF GROUP I AND GROUP II.

As regards any prophylactic effect of the preliminary inoculation with anti-typhoid vaccine in Group I (Rabbits 1 to 5), we may say at once that the inoculated group of rabbits showed no definite protection as compared with the non-inoculated group, nor is this result surprising when it is recalled that we administered directly into the blood-stream a large dose of living typhoid bacilli, thus opposing to the limited equipment of protective substances conferred on the inoculated animals a task out of all proportion to that which has to be encountered when an inoculated human being ingests into the intestine a relatively small number of bacilli in contaminated food or water. In comparing prophylactic with therapeutic inoculation, it must always be remembered that the former is intended to initiate a relative immunity sufficient to inhibit the development within the body of a comparatively small number of germs, while the latter is intended to supplement the efforts at immunization already initiated by body cells attempting to cope with an established attack. We believe that work on similar lines to these experiments may throw much light on the effects of protective inoculation, provided that due weight is given to such quantitative factors as the degree of antibody production and the number of living bacilli subsequently inoculated.



It is open to question whether rabbits are the best animals to use for such investigations. Possibly monkeys might furnish results more comparable with human beings. Large numbers of observations are essential both for the preliminary elucidation of conditions affecting the relative dosage of the prophylactic vaccine and the infecting inoculation, and for the subsequent experiments, so that the question of cost takes a prominent place in deciding upon what animal to use. The experiments of Metchnikoff and Besredka point to chimpanzees as the ideal animals for this purpose, but the expense is prohibitive.

Turning to the cultural and post-mortem results of the experiment under consideration, the apparent absence of any prophylactic result from the preliminary inoculation makes it possible to treat the whole series as one group. Of ten rabbits examined, a secondary typhoid septicæmia was only demonstrated in one, this being on the eleventh day after inoculation. This rabbit also differed from the others in showing irregular temperature for several weeks after inoculation, and in giving a positive splenic culture on post-mortem nineteen days after inoculation.

This failure to confirm Johnston's observation in more than one case out of ten may be due to our having worked with a less virulent strain of *B. typhosus*. The strain used, *B. typhosus* "Eyre," had been isolated by one of us a year and a half before from the blood of an acute case, but had been frequently subcultured in the interval, so that its virulence was undoubtedly very low. It is interesting to note that out of seven rabbits post-mortemed up to the thirty-fourth day after inoculation, *B. typhosus* was isolated from the liver in five, while there was only evidence of infection of the bile and gall-bladder in two.

These results differ from those recorded by other workers who have invariably obtained a large number of positive cultures from the bile and the gall-bladder, while positive cultures from the liver have been much less frequent. Johnston mentions negative findings in the liver in four cases, and makes no record of positive cultures from that organ, though the bile was infected in a majority of the animals examined.

Doerr ("Experimentelle Untersuchung über das Fortwuchern von Typhusbazillen in der Gallenblase," *Centralblatt von Bakt.*, Bd. xxxix, p. 625, 1905) records four positive liver cultures from nine rabbits, all of which gave positive cultures from the bile. In none of his cases was liver culture mentioned as positive after the fourteenth day.

Hailer and Rimpau ("Versuche über Abtötung von Typhusbazillen im Organismus," *Arbeit aus dem Kaiserlichen Gesundheitsamte*, Bd. xxxvi, p. 409) obtained many positive cultures from the liver but, apparently, none after the fourteenth day.

Somewhat similar results were obtained by Chiarolanza (*Zeit. Hygiene*, Bd. lxii, p. 2), but he, too, only found the liver positive at short intervals after inoculation. We think the discrepancies may be explained as follows:—

(1) The small number of positive results from the bile and gall-bladder are owing to the fact that we made no post-mortem before the nineteenth day after inoculation. Had we killed the animals within the last fortnight after inoculation, our results would probably have been comparable with those of others in this respect.

(2) Our success in isolating *B. typhosus* from the livers of five out of seven rabbits killed between the nineteenth and thirty-fourth day after inoculation may be attributed to our having worked with very large quantities of liver substance, whereas most of the recorded liver-cultures have consisted in the addition of a loopful of liver substance to some culture medium. We think it probable that *B. typhosus* could be recovered from the liver in nearly every case within the first two or three weeks after intravenous inoculation, if a sufficient volume of the liver substance were used. In another series of four rabbits post-mortemed by us within twenty-four hours of intraperitoneal inoculation, the liver substance was found to give positive cultures in all.

It is probable that the isolation of *B. typhosus* from the bile in the first fortnight after inoculation usually depends on the presence of germs coming from the infected foci in the liver and is really an indication of infection of that organ. Only in cases where the gall-bladder itself becomes infected is it possible to isolate *B. typhosus* from the bile at long intervals after inoculation.

#### CONCLUSIONS.

(1) Prophylactic inoculations, in the doses given, had no appreciable effect, two rabbits out of three in each group showing the presence of living typhoid bacilli in the tissues up to nineteen days and over after inoculation, and one rabbit out of each group becoming an excreter of typhoid bacilli, the excretion being associated with bacterial deposits and histological changes in the gall-bladder.

(2) Positive cultures of *B. typhosus* were obtained from the livers of five out of seven rabbits post-mortemed between the nineteenth and the thirty-fourth day, and in five out of twelve rabbits post-mortemed between the nineteenth and forty-seventh day, after intravenous inoculation of one-tenth of an agar culture of *B. typhosus*.

(3) These results deserve consideration in connexion with the use of living anti-typhoid vaccines administered intravenously, as suggested by Nicolle, Conor, and Conseil (*Comptes - Rend. Acad. Sciences*, July 15, 1913, p. 147), though, of course, the difference in dose must be borne in mind.

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## LEAVES FROM A NOTEBOOK.

BY COLONEL R. H. FIRTH.

## I.

MOST readers of this Journal are familiar with bacteriological technique, and cannot have been unimpressed with the profound chemical changes which bacteria set up in the sugars and higher alcohols. From an early date, advantage has been taken of this for the manufacture of lactic and butyric acids on a commercial scale, and the aid of bacteria has been invoked in recent developments of industry such as the production of acetone, of fusel oil, and ultimately of rubber. Apart from these commercial applications, the subject of the chemical action of bacteria has been studied from the qualitative point of view as an aid in the differentiation of various species of micro-organisms. As the result of such work it has been found possible in many cases to construct a fairly complete balance-sheet for an organism, showing the products formed from any given substance. Qualitatively, the substances resulting from the bacterial decomposition of a compound such as glucose are limited in number, but vary for the different species of bacteria. Thus, organisms of the butyric group produce butyric acid, butyl alcohol, ethyl alcohol, acetic acid, lactic acid, and a gaseous mixture of carbon dioxide and hydrogen; on the other hand, the true lactic acid bacteria produce nothing but lactic acid, while the intestinal bacteria form alcohol, acetic and lactic acids, with either formic acid or a mixture of carbon dioxide and hydrogen. Another group produces butyleneglycol and a small amount of acetylmethylcarbinol, along with alcohol and small amounts of acetic and lactic acids. Succinic acid is an invariable accompaniment of bacterial action on glucose. Whether its origin is always the amino acids of the protein, as in the case of yeast action, is not certain. In any case it is often produced ultimately from the sugar, since it is formed even when the only nitrogen available is as an ammonium salt.

The question arises, how is such a complex change brought about? Whether the change is due to enzymes or to the general activity of the living bacteria, may be taken as settled in favour of the former alternative. We know from the work done on the

zymase of yeast that at least two species of bacteria produce their characteristic effects by means of enzymes. One of these is a lactic acid producing organism, and capable of converting sugar into lactic acid after it has been killed and dehydrated by means of acetone. Direct proof of the enzymic action of all other bacteria is very difficult to adduce, but it is a fair assumption that such is in reality the case. We know little, as yet, of the number of enzymes concerned or of the chemical process involved in the action of each. A suggestive hypothesis, as regards bacterial action, holds the field at present. According to it, the production of butyric acid and similar bodies is preceded by the formation of a two-carbon compound, acetaldehyde, which then undergoes condensation and intramolecular change or simultaneous reduction and oxidation. Direct proof of this is wanting, but it is very probable, since *Bacillus lactis aerogenes* is capable of building up butyl derivatives both from acetaldehyde and from ethyleneglycol. Some evidence as to the number of enzymes concerned in each fermentation is deducible from the molecular ratio of the products formed. Thus, not a few of the intestinal bacteria produce alcohol and acetic acid from glucose in equimolecular proportions, and it is difficult to avoid the conclusion that those substances are the result of a single enzyme. Other light on this interesting question is afforded by observations on bacterial variation under certain cultural conditions. Thus, *B. typhosus*, which normally does not ferment lactose, acquires this function after long cultivation on a medium containing that sugar. Similarly, *B. coli communis* and some of its congeners undergo a curious variation when cultured in the presence of sodium chloro-acetate. This salt acts as a moderate inhibitor, as little as from 1 to 2 per cent of it in agar preventing the growth of the organism. If present in lower percentage, the inhibiting action of sodium chloro-acetate is selective. This selective action shows itself in the fact that some of the resulting colonies of *B. coli communis* from the medium no longer produce gas from glucose, though they continue to form acid from that sugar and still form both acid and gas from mannitol. This observation suggests that some one or more of the bacillary enzymes have undergone modification concurrent with the bacillus itself acquiring a power to resist the sodium chloro-acetate.

Arising out of the foregoing observation is the point whether the bacillus has lost the power of decomposing formates, since any production of gas from glucose by *B. coli communis* is due to the formation and later decomposition of formic acid or a formate. As

a matter of fact, the selected or functionally varied bacillus is found to decompose a formate as freely as the original strain ; it follows from this that the power to produce formic acid only has been modified. Further, we happen to know that the chemical action of *B. coli* on glucose is the production of carbon dioxide and hydrogen in relatively small, and of alcohol and acetic acid in larger amounts. Now, a quantitative examination of the products of the functionally varied bacillus indicates that the loss or reduction of power to produce gas from glucose is accompanied by a diminution in the production of the amounts of alcohol and acetic acid and by an increase in the amount of lactic acid. We may infer from this then, that at least three enzymes are concerned in the decomposition of glucose by the *B. coli communis*, namely, one forming acetic and formic acids and alcohol, one which decomposes formic acids, and one producing lactic acid. Of these the first is present in relatively smaller amount in the species of *B. coli communis* varied by growth in the presence of sodium chloro-acetate. Further, since this altered organism still attacks mannitol with production of gas, it is probable that another enzyme is involved in the attack on that substance. This note, therefore, suggests a means of analysing the complex action of bacteria into simpler enzymic reactions, and, moreover warrants the anticipation of a future when bacteria will be selected for specific chemical purposes.

The nature and action of the enzymes is still largely a mystery, but if we regard them as catalytic agents produced by living organisms, their behaviour in promoting hydrolysis presents points of similarity to and of difference from the acids, in respect of the same substance. This consideration is quite apart from the essentially selective action of enzymes, which differentiates them from all other hydrolytic agents. To be exact, the enzymes are selective colloidal catalysts, present in living cells and destroyed by heat ; and, being colloids, must have a large surface development as compared with the acids which are crystalloids. It is well known, in connexion with enzyme action, that when the proportion by weight of enzyme is very small, compared with that of the substance on which it is acting, equal amounts of the hydrolyte are changed in equal successive intervals of time ; that is, change proceeds at a linear rate. Herein lies another point of difference between the enzyme and the acid, as it is now known that the hydrolysis curve following acid action is not linear but logarithmic. Some recent work of Emil Fischer shows that there is a relationship between the enzyme and the configuration of the hydrolyte ;

so much so, that action depends on the enzyme finding a molecular arrangement correct as to the disposal or placing of the groups on each one of its asymmetrical carbon atoms. The interesting fact, that the mere loss of its asymmetric character by an asymmetric carbon atom in a molecule will throw that part of the compound so much out of harmony with the enzyme, as to prevent the enzyme effecting hydrolysis, is a curious confirmation of the essentially specific nature of enzyme action.

To us, the proteoclastic enzymes are the most important; they are of two kinds, namely, the peptic enzyme of the stomach which acts in an acid medium, and the tryptic enzyme of the pancreas and other glands which acts preferably in an alkaline medium. The hydrolysis of a protein by hydrochloric acid alone suggests great similarity to that by pepsin, so much so, that we may almost regard pepsin as a catalyst intensifying the activity of the acid. The alkaline and tryptic digestions are suggestively similar, and what differences there are between them are due probably to secondary changes induced by the alkali.

## II.

How many of us, who admire the beauties of flower colouring, have any idea of the wonderful chemistry associated with their manifestation? Roughly, the colouring matters of flowers and plants are of two kinds, the soluble pigments in the cell sap and the insoluble coloured plastids scattered through the protoplasm. Botanists call the soluble pigments by the general term of anthocyanin, but for the most part their structure is unknown. On the other hand, the plastids, which are usually yellow, red, and orange, are probably hydrocarbons. Although so little is known of the structure of plant pigments, some progress has been made as to the manner in which they arise; this is particularly so in regard to the red, purple, and blue colours of flowers. The formation of pigment appears to be due to the action of an oxydase on a colourless chromogen, which does not exist normally as such in the cell sap, but is present in the form of a glucoside. Under certain conditions in the metabolism of the plant, the glucoside becomes hydrolysed by its appropriate enzyme, and the liberated chromogen is oxidized by an oxydase to form the soluble pigment. The discovery of the oxydases followed an inquiry which showed the formation of blacks and browns in vegetable and animal tissue to be the result of oxidation. The oxydases fulfil the accepted conceptions of enzymes generally,

but differ from them in that they appear to be destroyed during the process of oxidation. The modern view as to the nature of the oxydases regards them as consisting of a peroxydase with an organic peroxide, which may be replaced by hydrogen peroxide.

The earlier ideas concerning the oxidation of the colourless chromogen involved only the chromogen, the oxydase, and atmospheric oxygen, but recent work indicates that protein degradation products are concerned in the change and also possibly incorporated finally in the molecule of the pigment. Working with *p*-cresol as his chromogen and tyrosinase as the oxydase, in the presence of a variety of amino acids, peptones and other products of protein degradation, Chodat has succeeded in obtaining a very wide range of colours. His work affords the strongest confirmation of the view that the natural pigments arise by oxidation. That the chromogen is present in the form of a glucoside is deducible from Palladin's work on the respiratory chromogens. These he regards as behaving in the same way as anthocyanin pigments, namely, the chromogens are cyclic substances present as glucosides, from which by the action of hydrolytic enzymes they are separated from the sugars, and then, taking up oxygen by the aid of the oxydases, become coloured. During the normal life of a plant, the oxygen is given up again under the influence of reducing substances, but if anything occur to upset or disturb the balance of interaction of the hydrolytic, oxidizing, and reducing enzymes, then the respiratory chromogens become evident by their colour. Well-known disturbing factors are mechanical injury, frost, or treatment with anæsthetics.

It is difficult for us to conceive what is happening in the plant cell, but it is evident that, normally, enzymes and the substances on which they act must be kept apart. Recent work has indicated the existence of hormones, or substances capable of penetrating cell walls and setting up chemical interactions within the cell. Now, the hormones include a number of substances present in plants as glucosides. Their influence on the enzyme balance must be far reaching; for, immediately a small amount of glucoside has become hydrolysed, the non-sugar constituent produced acts as a hormone, causing further liberation of active enzyme within the cell. In that way the oxydase becomes set free to act on the liberated chromogen. This idea of the co-ordination of hydrolytic and oxidizing enzymes is supported by what is known about the odoriferous principles of plants. Examples of this are presented by the vanilla bean and the meadow-sweet. In the former coniferin is

hydrolysed by emulsin to glucose and coniferyl alcohol, which is then oxidized into vanillin by an oxydase. Similarly, in the meadow-sweet, its fragrance is caused by the combined action of emulsin and an oxydase on salicin, converting the saligenin into salicylaldehyde.

To demonstrate more conclusively the part played by oxydases in pigment formation, it is desirable to localize them in the plant and identify their distribution with the anthocyanin pigment. By means of  $\alpha$ -naphthol and other reagents, it is possible to get a mauve reaction with an oxydase present in the veins of flower petals; similarly, benzidine gives a brown with the oxydase present in the veins and epidermal skin of plants. Most of the work of this kind has been done on the Chinese primula, and it shows conclusively that the distribution and intensity of the oxydase reaction coincide with that of the pigments. An interesting side issue of this investigation has been the confirmation it affords to a genetic problem. Two types of white are known in both plants and animals. These whites, though indistinguishable to the eye, differ in their genetic behaviour. One known as recessive white when crossed with colour gives coloured offspring in the first generation, and these, when interbred, give offspring in the Mendelian proportion of three coloured to one white. The other type, known as dominant white, gives white offspring when mated with colour in the first generation, and three white to one coloured when these are self-fertilized in the second generation. The explanation of this is that the recessive whites lack chromogen or oxydase or both, whereas in the dominant whites both oxydase and chromogen are present, but associated with a factor which inhibits the oxidation. The same Chinese primula has afforded evidence as to the localizing of oxydase. Flowers of the recessive white type are found to contain abundant oxydase, but apparently lack chromogen, since similar coloured flowers gave the same oxydase reaction all over the epidermal skin. In the dominant white type of flowers no oxydase reaction was obtained. If, however, these flowers were soaked in a solution of carbon dioxide for some hours, the inhibitory substance was removed to some extent; if treated with dilute hydrogen cyanide solution, the inhibitory factor was so far removed that a strong oxydase reaction resulted. These experiments show clearly that dominant white flowers of the Chinese primula do contain an oxydase, whose action is ordinarily inhibited.



## III.

As we eat our breakfast egg, how many of us ever think of the nature and importance of the colouring matter so characteristic of the yolk? Probably, none of us; and yet it represents a class of substances of very great interest. It belongs to the lipochromes, or pigments characterized by their solubility in fat or oils and in most of the organic solvents, yet insoluble in water and the dilute acids and alkalies. The lipochromes oxidize and bleach gradually on exposure to air, give intense blue, greenish-blue, or violet colorations with strong sulphuric or nitric acids, and show characteristic absorption spectra in the blue and violet. These lipochromes are present in egg-yolk, blood-serum, milk-fat, and in certain roots, berries, and plant juices. Very few of them have been isolated in the pure state, owing to the difficulty of separating them from the associated lipid bodies, and it is probable that their actual number is small in spite of the many names proposed for them by various workers. Certain broad classifications of the lipochromes are based on differences in solubility and spectroscopic behaviour. Thus, those soluble in chloroform and ether and giving two absorption lines in those solvents are called chlorophanes; and those soluble in alcohol and giving one absorption band are called rhodophanes. A later and better classification distinguishes two groups, one easily soluble in light petroleum but with difficulty in alcohol, and the other soluble in alcohol but not in light petroleum.

Of the lipochromes soluble in light petroleum, the best known is carotene or the conspicuous pigment of carrots. This pigment, although occurring principally in carrots, is present, together with chlorophyll, in the chloroplasts of many plants. Closely allied to it is the yellow pigment of the corpus luteum of mammalian ovaries. Escher, by extraction from ten thousand ovaries, has succeeded in getting half a gramme of the pure substance, and finds it indistinguishable from carotene of carrots and nettle leaves. It is a highly unsaturated body, absorbing oxygen from the air readily and thereby discharging its colour; it absorbs nitrogen peroxide with evolution of heat, and gives a crystalline product with two atoms of iodine. It is characterized by a high capacity for absorbing blue and violet light in the spectrum. Another pigment of the same group is lycopene obtainable from the tomato; this is a hydrocarbon like carotene, but differs from it in the position of the absorption bands.

Representing the lipochromes soluble in alcohol, are xanthophyll from green leaves, and lutein from egg-yolk. These are

substances similar to carotene in chemical behaviour but containing oxygen. By working on the yolks of six thousand eggs, Escher obtained two and a half grammes of pure lutein, as orange-red prisms which melted at  $195^{\circ}\text{C}.$ ; it is isomeric with xanthophyll, but the latter melts at  $173^{\circ}\text{C}.$  The yellow colouring matter of milk-fat belongs probably to the carotene group and so do the yellow pigments of many other animal fats.

An interesting group of lipochromes is that existing in the retina of the eyes of birds. In those retinæ are minute oil droplets containing differently coloured pigments in solution; as yet these pigments have not been obtained in the pure state, but their existence is of unusual interest having regard to their great capacity for the selective absorption of light. A feature of the literature of the lipochromes is the frequency with which they are described as occurring in the female reproductive organs and in eggs; while in certain crustacea, it is only in the blood-serum of the female that these pigments occur. Among plants the lipochromes are commonly present in fruits and seeds from which the chlorophyll is absent. The idea suggests itself that they may act as carriers of oxygen in the formation of chlorophyll in plants and of hæmoglobin in animals, and that their conspicuous presence in the embryo is preparatory to the formation of these pigments of adult life. The idea is purely speculative, but it affords an explanation of their occurrence in certain organs and nowhere else.

#### IV.

Modern clinical work, especially in the field of tropical disease, directs our special attention to the living cell and its nucleus. It is of interest, therefore, to note that recent work shows progress in the direction of a clearer understanding of the chemical structure of the material of which the cell nucleus is composed. We are all familiar with the fact that the nucleus consists chiefly, if not entirely, of protein with a complex acid called nucleic acid. The protein may be a pro-amine, a histone, or one of the more complex and less basic members of the group, but the difficulty lies in understanding the mode of combination of the protein with the nucleic acid. It has long been recognized that nucleic acid is composed of phosphoric acid, a sugar, and one or more bases of the purin or pyrimidine group. The first step in the recent advance was the discovery that guanylic acid from the pancreas can be

hydrolysed in two different ways. In acid solution, the purin base is split off and a phosphoric ester of a sugar, *d*-ribose, produced. In neutral solution, the cleavage of the molecule yielded phosphoric acid and the nucleoside, guanosin, which on further hydrolysis decomposes into *d*-ribose and guanosin. Further work on the nucleic acid of yeast showed that, on acid hydrolysis, it yielded no less than four different bases, namely, the two purin bases guanine and adenine, and the two pyrimidine bases, cytosine and uracil. The clue to the constitution of the nucleic acid was afforded by the fact that hydrolysis in neutral solution yielded, among other products, the same guanosin which had been obtained from guanylic acid. The other products are four molecules of phosphoric acid and three other nucleosides, each consisting of a molecule of the same *d*-ribose combined with one of the bases adenine, cytosine, and uracil. These are derived from groups resembling guanylic acid, but containing different bases, and to these the name of nucleotide has been given.

As there is evidence that the nucleic acid of animal organs and tissues is similar, if not identical, in chemical structure with that of yeast, we are in a position to say that nucleic acid is made up of four nucleotide groups, each consisting of phosphoric acid, *d*-ribose, and a base. The mode of combination of these groups is doubtful, but one can conceive it being effected by an anhydride coupling between the hydroxyl groups of the phosphoric acid radicals. The first action of the acid is to liberate the four nucleotides, and of these the two containing cytosine and uracil have actually been obtained. An interesting question arises, how is this complex molecule of nucleic acid built up and broken down in the living body? As to the synthesis of the acid we know nothing; but a regular battery of enzymes is known which enables the organism to decompose nucleic acid, first into the nucleotide, then into phosphoric acid and nucleosides, and finally into carbohydrate and base, which is in accord with the course of hydrolysis in neutral solution. Specific enzymes exist for each stage of the process; they are to be found in almost all the animal organs, but are absent from the gastric and pancreatic juices. The intestinal juices can take the decomposition as far as the production of nucleosides, but no farther. The purin bases, thus liberated in the natural metabolism of the cell, undergo further enzymatic change, and are in part excreted as uric acid, the remainder being oxidized. The existence of such a complex in the nucleus, and the provision of means by which it can be resolved into its simpler

units is consistent with the functional importance of this part of the cell. The whole investigation is but a step nearer to an understanding of the fundamental mechanism of life itself.

## V.

No reader of current medical literature can fail to have been struck by the subtle change which is coming over our theory of dietaries. In the light of recent work, our conceptions as to nutrition and the metabolism of the foodstuffs call for revision. In place of valuing the foodstuffs only by their content in terms of protein, hydrocarbon, carbohydrate, and calorie, we shall need to look deeper, that is, look to the composing molecules which represent and go to constitute what we call proteins, hydrocarbons, and carbohydrates. Confining one's remarks to the proteins, it will be remembered that the attack on their constitution was begun by Fischer, by the systematic study of the individual amino acids and their volatile esters, all of which have now been prepared synthetically and all but three resolved into their optically active isomerides. That work shows that the proteins differ enormously in the quantity and nature of both their constituent molecules and cleavage products. The relative quantities of amino acids in a protein is probably a very important factor in its nutritive value. Experiments show that the proteins deficient in tyrosine, tryptophane, and phenylalanine are quite unable to keep the body in nitrogen equilibrium. Other experiments show that if dogs are fed with their own proteins, that is proteins typical of their metabolism, a relatively small amount of nitrogen input suffices to keep them in nitrogen equilibrium. From this we can infer that an animal fed on proteins which differ as to their amino acid content from the proteins of its own body, is compelled to use more proteins and is able to turn to good account those excess proteins, existing in its food, only so far as their cleavage products are consistent with its own metabolic idiosyncrasies.

From these considerations, it is permissible to infer that to say a given diet contains so much protein is not enough; we need to be more precise as to the nature of the protein input and to know how much of that protein is assimilable and how much is wasted. From this point of view we can understand how and why many people take in their food more nitrogen than is necessary. In the same sense, we obtain the clue as to some of Chittenden's results and, indirectly, find a reason to think that much of the criticism

levelled at his teaching is not only unwarranted, but itself based upon ideas which, in the light of recent work, calls for revision. Were our knowledge more complete, it would be possible to lay down a diet, and to detail precisely all and only those substances which are necessary for life. Were we able to do this, it is probable that the protein input would be much below the figure which orthodox present day teaching lays down as needful; and possibly also the figures for fats and carbohydrates would be materially modified. The truth is we are very ignorant still, and, when we talk of protein, we speak of something of which we are only now beginning to know the real facts. The same can be said of the fats and carbohydrates. Therefore, in this matter of nitrogen or any other metabolism, it seems desirable that we should not be hasty in our criticisms of results which do not quite square with all the facts as we happen to think we know them. What the future has in store for us in the way of knowledge, no one can say; but it is not beyond the bounds of possibility that, so far as concerns the protein input, the routine procedure will be to estimate the value of a diet in terms of amino acids, tri-peptides, and poly-peptides; and that the correct protein input or content of a given dietary will be synonymous with a mixture of these bodies in right proportion.

Other possible developments suggest themselves. It is obvious that the definite amount of protein, amino-acid, tri-peptide, of fat, or of carbohydrate necessary, cannot be considered only from the point of view of food. We know that they are used as such, or more probably transformed within the body into substances which are able to act in very small quantities. Such substances are familiar to us as enzymes, hormones, and products of the special secretory glands; as to the nature and action of these substances, we are only now beginning to get an inkling. The vista which these considerations must raise in any thoughtful mind may not warrant the conception of an artificial food, but in the minds of some advanced thinkers and workers it has gone as far as that. The synthetic diet has advanced beyond the stage of hypothesis, and has been the subject of actual experiment. No satisfactory answer can be given yet to the question whether prolonged maintenance is possible on synthetic dietaries. Hopkins finds that, when the food has been extracted thoroughly with alcohol, there is a loss of weight after quite short periods of the feeding, but he avoids giving a direct negative to the question. Osborne and Mendel, whose experiments lead them to give an affirmative answer, realize the complexity of

the subject, and draw a distinction between the maintenance of life in adults and the maintenance of growth processes in young animals. It is clear that the artificial food gives less favourable results in the latter. Abderhalden, who is much more positive as to the success of the synthetic diet, has experimented on lines which are open to criticism. His amino-acid material was either digested flesh or digested casein, less favourable results being obtained with the latter; these products can hardly be regarded as so thoroughly purified as the alcohol extracted materials used by other workers. The chief criticism rests on the short duration of the feeding, especially with so large an animal as the dog; for it is possible that a certain store of the essential constituents, missing from the artificial diet, were available in the animal's body. Rats certainly thrive on the synthetic diet for a time, but subsequently fall off.

An essential constituent would seem to be missing from all synthetic food yet tried, and the amount of fresh milk required to supply it to animals under experimental observation, is curiously small and an optimum is soon reached. The addition of salt-free extracts of yeast to the artificial diet gives similar results. The facts cited bring out clearly the need of an essential constituent, but they give no clue to its nature. Progress in the desired direction is afforded, possibly, by the work of Funk. By an elaborate exhaustion of yeast, of milk, of rice polishings, with alcohol, Funk has isolated a substance having an undoubted curative effect in the polyneuritis of pigeons and in beri-beri. He calls it *vitamine* and shows it to be a base belonging probably to the pyrimidine group; it seems to be analogous to uracil and is possibly a constituent of nucleic acid. We are still without precise evidence that the addition of *vitamine* to a synthetic diet will enable growing animals to make proper use of the nutritive elements supplied therein. Until this is done the connexion between the two lines of research are hypothetical, but the indications are both suggestive and promising.

Whilst proteins and carbohydrates are undoubtedly indispensable to any dietary, there is still no definite information available as to the actual requirement of fat. By confining their extraction methods to the action of ether, Osborne and Mendel have shown that rats can thrive well for long periods on an absolutely fat-free diet; they claim that their work gives positive evidence of the dispensableness of true fats for growth. The whole problem of rational feeding has obviously an industrial as



well as a physiological importance, and anything throwing light upon its difficulties must interest us equally as mere citizens as doctors; its influence as affecting our control of pathological states, such as scurvy and beri-beri will more than justify the labours of the research.

## VI.

If questions concerning the nutrition of man and animals be of interest, those relating to analogous points in respect of plants are not less so. Most of these involve questions of soil states and particularly of what is called "humus." The term is rather indefinite, but we may define it as that part of the organic matter of the soil which has undergone partial decay by the action of bacteria. Two processes of bacterial decay in soil can be distinguished, namely, one with an abundance of air and one associated with a more or less complete absence of air. It is under conditions of poor aeration that the greatest formation of humus takes place. The actual chemical composition of humus varies, but it always contains more carbon and less oxygen and hydrogen than the material from which it was formed. In addition, humus always contains nitrogen and some phosphorus, and by degradation these serve as the source of food for the soil bacteria, and finally for the growing plant. Apart from this direct influence on the supply of plant food, humus determines the physical nature of all soils. In normal soils, this influence is uniformly good, and due to the colloidal properties of humus. This action is largely towards increasing the water-holding capacity of a soil, and is of particular importance in sandy soils. Further, the absorptive power of soils for various materials is greatest in those rich in humus or clay, that is, rich in constituents having the largest surface and which function as colloids. It is in the appreciation of the important part played by colloids in soil that modern agricultural chemistry is characterized; a rough but useful estimation of the colloidal content of a soil can be made by noting the absorption of a dyestuff by a soil, as the amount removed from solution, by a given weight of it, is directly proportional to the colloid content.

As a practical horticulturist, one has been struck by the ease with which certain "sick" or over-decomposed soils can be restored to health, and consequent utility, by treatment with a weak antiseptic. Every one knows that when a sick soil is heated by steam to 98° C., it regains its original productiveness; but it is not possible for the average man to apply steam in this way,

therefore, the utilization of an antiseptic to the same end is a point worth noting. My own observations have been made by dosing sick soils, and some which were not sick, with 0.1 per cent solutions of formalin, and of carbolic acid. The results have been surprising, for not only were useless soils made nutritive, but ordinary soils made to yield robuster plants than untreated or control soils. The rationale of the results is clearly that of a simplification of the micro-organic population of the soil. One's observations are only in the rough stage, but given some degree of standardization and a greater range of antiseptics, the method promises a larger field of utility than that presented by a simple householder interested in his garden.

## VII.

Probably, no class of therapeutic agent excites more interest, at the present time, than the organic compounds of arsenic and antimony. They have been known for years, but only recently recognized to possess any great practical value. It is well known that the most important application of these compounds is in the treatment of trypanosomiasis, and of syphilis. The general principle underlying their preparation is the fact that aromatic amines and phenols having an unsubstituted para- or ortho-position react with arsenic acid, yielding amino-phenylarsinic and hydroxy-phenylarsinic acids; for example, aniline and arsenic acid gives p-amino-phenylarsinic acid, and phenol and arsenic acid give p-hydroxy-phenylarsinic acid. Of the many compounds containing pentavalent arsenic, the only ones of therapeutic importance are atoxyl, the acetyl derivative of atoxyl known as arsacetin, and the corresponding compounds of o-toluidine. By the reduction of the arsenic acids, compounds have been prepared in which the arsenic is in the trivalent condition, and these are found to be more active than the arsenic acids as therapeutic agents. Salvarsan or dihydroxy-diamine-arsenobenzene is of this class. It is prepared from p-hydroxyphenylarsinic acid, which is nitrated with a mixture of nitric and sulphuric acids, the entrant nitro-group taking up an ortho-position with respect to the hydroxyl group. This nitro-compound, on reduction, yields the final product.

It is obvious that the value of preparations of this kind depends on the manner in which arsenic compounds affect the protozoa causing disease. Atoxyl does not kill *Trypanosoma gambiense* in blood serum *in vitro*, but in the body it has a trypanocidal action, even in high states of dilution. This fact is explicable on

the assumption that atoxyl is decomposed in the body with the liberation of arsenious oxide, and the assumption is confirmed by the fact that the latter is an active parasiticide *in vitro*. Against this idea, is the fact that no arsenic acid is excreted. A better explanation is, perhaps, that the body changes the atoxyl into a more toxic compound; that some such compound is so produced is suggested by the circumstance that most of the atoxyl is excreted unchanged, so that only a small proportion is used in killing the protozoa. This hypothesis is supported from the observation that the trypanocidal action of atoxyl is proportional to its toxic action on the host, indicating that parasiticity is dependent on changes in the host tissues. The success attending the use of organic compounds of arsenic has suggested the action of antimonial compounds in the same connexion. Antimony is more powerfully trypanocidal than arsenic, but its inorganic compounds are highly irritant, and its aromatic compounds corresponding to those of arsenic very difficult to obtain. The future is promising in this respect and, according to present indications, new organic antimony compounds of therapeutic value should soon be available.

#### VIII.

In the treatment of diseases caused by protozoa, one of the greatest difficulties met with is the power which some of the parasites possess of becoming resistant to the action of the specific drug used. We have examples in the case of malaria plasmodia becoming immune to quinine, and the syphilis spirochaetes to the action of mercury and arsenic. As far back as 1907, Ehrlich found that *T. brucei* in mice could be removed from the circulation, by feeding the mice with fuchsin. Eventually, they reappeared, but could be banished again by a second course of feeding with fuchsin; but this could not be repeated indefinitely, as there came a time when the drug had no effect on the parasite. In this way, a race of trypanosomes had been produced which were immune to fuchsin. Moreover, the parasites retained their fuchsin-resisting power when passed through a series of mice. Ehrlich next developed races of trypanosomes resistant to other agents, and extended his experiments to the production of a strain of *T. brucei* which had become resistant to salvarsan. The resisting power of this trypanosome against atoxyl persists in the mouse through a very large number of generations. Mesnil and Brimont extended these observations to *T. evansi*, and found that race to maintain its acquired power of

resisting atoxyl unimpaired even after over a hundred passages through mice, without any fresh contact with the drug. But, when this race was injected into rats, the trypanosomes lost at once all power of resisting atoxyl. A further extension of observations was made by Breinl and Nierenstein, who developed an atoxyl-resistant race of *T. equiperdum* in donkeys. The inoculation of this resistant strain into rabbits and rats caused it to lose the power, but directly the strain was inoculated into a donkey the resisting power was restored, in spite of many months having elapsed.

In this connexion, some recent work by Gonder is of importance. He produced a strain of *T. lewisi* in the rat, resistant to arsenophenylglycine, and transmitted it to normal rats by the rat-louse. The normal rats became infected, but the trypanosomes were resistant or non-resistant according to the mode of infection. If carried in fresh rat blood on the mouth parts of the louse, these mechanically transferred parasites retained their drug-resisting power. If, however, the trypanosomes had passed through a developmental cycle in the louse, it was found that the new generation, developing in the freshly infected rat, had lost completely the acquired character of resistance to arsenophenylglycine. As a result, when rats were infected by lice in which the parasites had undergone a life-cycle, the trypanosomes which developed in their blood were normal and disappeared from the circulation on injecting the drug. The only inference possible is that the drug-resisting power is eliminated by passage through the intermediate host.

It has been suggested that the drug-resisting power of trypanosomes towards organic arsenical compounds is due to their "chemo-receptors" having lost their avidity for the drug, through prolonged dosage. Against this is the fact that atoxyl does not act directly on the parasites, but only after it has combined with the blood proteins, consequently the resisting power is an acquired immunity against the atoxyl-serum. If this be so, then the resistance acquired in one species, and lost on transfer into another, is due to the blood proteins of one animal differing from those of another. Neither atoxyl nor acetatoxyl appear to produce cytological changes in the parasites. Owing to experimental difficulties, little is known regarding acquired resistance in the case of malaria, syphilis, and similar protozoal diseases. Though not quite conclusive, the interesting work of Neiva of Rio Janeiro supplies evidence in favour of the view that the resistance against quinine acquired by the malaria plasmodia resembles closely that of trypanosomes against

arsenic. He claims to show that the quinine immunity acquired by the parasites is lost on passage through the intermediate host, the anopheles mosquito. Another interesting point is the fact, brought out by Morgenroth, that the drug-resistance is frequently reduced by the exhibition of a second parasiticide. Thus, trypanosomes, resistant to atoxyl, lose their resistance on treatment with hydroquinone which is also trypanocidal. Similarly, malaria parasites which have acquired an immunity against quinine, become less resistant to cinchona preparations after injections of salvarsan. This is consistent with the empirical practice of ringing the changes on arsenic and quinine in cases of obstinate paludal infections. It must be admitted that there are many gaps in our knowledge to be filled, still the small advances made are gradually bringing us nearer to the much desired goal.

#### IX.

The physics of solids, and issues involving the very nature of matter itself, have received interesting help from recent work in crystallography. This work affords the first actual proof of the accuracy of the atomic theory, and renders the laborious destructive processes of chemical analysis superfluous whenever the substance is available in the condition of good crystals. All crystals of a definite chemical substance are characterized by certain properties. They possess true plane surfaces arranged in accordance with a regular plan of symmetry or style of architecture, and are mutually inclined to one another at angles constant for that same substance, whatever be the relative amount of size of each individual face. The number of faces possible is limited strictly by a law, the essence of which is that only such faces are possible as cut off simple integral relative lengths of the imaginary axes which define their geometrical positions in space. To appreciate what this means, we must remember that there are not an infinite number of pyramids possible in any particular system of symmetry, but that only a few pyramids are possible, and a very few actually present, namely, those having whole number intercepts on the axes, such as anything from 1 to 6. Thus, the series of pyramids proceeds by definite steps, as if the structure were built up of blocks of tangible size; the pyramidal angle depending on how many blocks there are fewer in each layer as the pyramid is built. Owing to the blocks or bricks being of a size to include only a single chemical molecule, or at most a very few molecules, the step-like serrations of the surfaces are invisible to our eyes. In the isomorphous series of

substances, those having cubic crystals present an equality of angles, but, in the less symmetrical, the differences of angle follow the order of progression of the atomic weights of the elements of the same group which, by their interchangeability, produce the series.

The latest work indicates the structure of a crystal to be of the nature of a space-lattice. Such a space-lattice is comprehensible, if we conceive each of the bricks in the edifice to be represented by a central point, and these points joined by straight lines parallel to the edges of the bricks. We may regard each point either as the centre of gravity of the molecule or group of molecules of the substance forming the crystal, or as some particular atom, so long as the corresponding atom is taken in every molecule of the assemblage. There are fourteen possible types of space-lattice, and the stereometric arrangement of the atoms in the molecule permits of 230 possible different types of homogeneous structures. We have further the geometrical fact that there are only thirty-two possible types of crystal symmetry, known as classes; moreover, each of the 230 point systems possesses the symmetry of one or other of the thirty-two classes, and the latter are grouped into the seven systems of crystal symmetry; the system being thus the genus and the class, as it were, the species. The seven crystal systems are the cubic, trigonal, tetragonal, hexagonal, rhombic, monoclinic, and triclinic. Of the fourteen types of space-lattice, three are of cubic symmetry, two are tetragonal, two are trigonal, four rhombic, two monoclinic, and one is triclinic.

On the basis of these geometrical results, it is possible actually to calculate the relative sizes of the molecular or polymolecular bricks of the space-lattices of a series of isomorphous compounds. This is done by combining a knowledge of the relative density, and of the molecular volume with that of the crystallographic axial ratios. These dimensions are called molecular distance ratios, and the accuracy of the conception is proved by the fact that parallel growth of one crystalline substance on another occurs only in the cases of substances which have identical molecular distance ratios. From these considerations, it is apparent that the space-lattice is related intimately to the molecule, and that each node of the lattice represents one or more molecules, so arranged that the whole number of atoms present are in conformity with a point system. Each hypothetical point of the lattice represents a cluster of atoms forming the molecule as it crystallizes out. Now it is an experimental fact that those faces of crystals, which grow most slowly, are those along which the points of the space-lattice are most densely

strewn; consequently, we can conceive the correct axial system of a crystal to be that for which the primary faces are those that possess the maximum reticular density.

Having thus settled the axial scheme and determined, by goniometrical measurement, the crystallographic elements of a crystalline chemical substance, they are recorded in a table. The results are graphically entered on a stereographic net, and the calculations made as to which system and class the particular crystal belongs. Tables, comprising over ten thousand crystalline chemical substances, in all their crystallographic details, have been worked out and their elements reduced to their "form symbols." Hence, if a crystal of any one of these substances be placed in the hands of a competent observer, who is in ignorance of its chemical composition, he has only to investigate it and calculate its form symbol or crystallographic elements when its composition will be deducible, on reference to the table. The accuracy of this method by crystallographic analysis has been sufficiently tested as to demonstrate beyond all doubt its value, and to indicate it to be an important advance in methods of research, both as to chemical composition and the true nature of matter. Its practical utilization is obviously only for the highly-trained observer, but its principles and possibilities are such as to demand serious thought and appreciation by all scientific men.

## X.

To the man who keeps a motor-car, there is no question of greater economic and scientific interest than that of the future supply of motor fuel. From being almost waste by-products and a drug on the market, the lighter fractions from the distillation of crude oil have risen in twenty years to the position of being the refiner's most valuable products. The rise in price is due to several factors which are familiar. One fact stands out clearly and that is, that with less and less petrol being exported from America, owing to the increased home demand, it is of the first importance to find an alternative supply of fuel. The only sources likely to yield a large quantity at a sufficiently low price, are those portions of petroleum outside the petrol fraction, certain products of the carbonization of coal and shale, and products of fermentation. Already the distillation of petrol is being carried further and further into the kerosene fraction, as is only too well proved by the rise in the specific gravity of commercial petrol. These mixtures have defects only too well known by practical motorists.



A process, much in use at the present time, is the distillation of the heavier fractions of petroleum in contact with catalytic agents, such as nickel and palladium in colloidal suspensions. This method is probably less promising than the yield of petrol from heavy distillates resulting from the so-called cracking of the residues in order to simplify their structure into hydrocarbons of lower gravity. The theory of the process is the subjection of heavy hydrocarbons to heat under pressure, thereby producing a mixture of saturated and unsaturated hydrocarbons of lower boiling point and greater volatility than the original oil. We may regard this as the splitting of a long carbon chain, at one or more places, by means of heat and the subsequent addition of hydrogen. The hydrogen in this case being not separately produced but derived from some of the hydrocarbon already present.

Another process, used as a source of light fractions, employs what is known as "solar oil," which is obtained from American oil after the illuminant portion has been distilled off. The solar oil is sprayed with water into long iron retorts packed with iron turnings, and kept at a temperature of  $600^{\circ}\text{C}$ . As the water vapour and oil pass through the retort the oil is cracked, and the vapours travel forward to a condenser. As much as 39 gallons of petrol are obtainable from 100 gallons of solar oil; whilst of the remainder there are recovered 13 gallons of spirit and 13 gallons of an excellent varnish.

The foregoing processes are all very well, but their value is limited by the supply of crude oil, which is not unlimited. Attention, therefore, turns to coal and shale as sources of volatile liquid hydrocarbons. In the ordinary methods of coal gas manufacture the secondary changes and decompositions have gone so far that the residual tar contains but a trace of benzol vapour and other volatile portions. The coke-oven plants present the main source of benzol, and by them, when further modifications in carbonization have been effected, we have some hope of obtaining the lighter fractions from the liquid residual products more akin to petrol than to benzol, which are so much needed. Owing to its high sulphur content, commercial benzol makes an objectionable motor fuel, though in running it is 12 per cent more powerful than petrol. As the world's stores of petroleum, coal, and shale are all being depleted, the situation points clearly to alcohol from fermentation methods as our ultimate source of motor fuel. Alcohol, denatured with 10 per cent of benzol and tinted with a trace of aniline dye, will give a motor spirit at once safe, more

pleasant to use, and sweeter in exhaust than the petrol of to-day. Although the calorific value of such a mixture is but 0.6 of petrol, the smaller amount of air needed for its combustion, its increased explosive range and higher compressibility in the cylinder, all combine to make it the ideal motor fuel of the future, and, moreover, one about which no doubt need arise as to any limitation of amount available.

## XI.

A fitting sequel to the preceding note is one which attempts to consider the origin of petroleum, a question which, both to the geologist and chemist, has long exercised a peculiar attraction. One may, perhaps, be pardoned for reminding the reader that petroleum consists of a mixture of hydrocarbons conveniently divided into two homologous series—namely, the paraffins and the naphthenes, the former being chain and the latter ring compounds. The character of a petroleum depends upon the proportion of these constituents; in the American type the paraffins predominate, while in the Baku variety the naphthenes are the chief elements. With the paraffins and naphthenes are other classes of hydrocarbon, such as olefins, benzenes, and turpenes — also organic sulphur compounds, nitrogen bases, and some oxygen containing compounds; whilst in the residue after distillation are found solid hydrocarbons and thick oils. The problem is, how has this highly complex liquid originated in Nature?

Its origin must have been either inorganic or organic. The earliest idea as to an inorganic origin for petroleum had as its basis the fact that the interaction of water and metallic carbides produces simple hydrocarbons. That view breaks down in face of the facts that the oil is never found in Archæan formations or in the sea, and that such a complex mixture could not have been distilled by internal vulcanism to the upper cooler layers of the earth, nor could the oil's optical properties have survived the severe associated temperatures. Another difficulty is the circumstance that the fundamental assumption as to the prevalence of the metallic carbides is open to question, for carbides have not been found in eruptive material, neither do dry steam and the metallic carbides interact. Further, geology and cosmology are dead against any percolation of products, from chemical action, upwards through the strata, as it fails to explain the fact that oil reservoirs, once exhausted, are never renewed from below. We are thus driven back to the conception that petroleum has been formed *in situ*,

probably at a low temperature, and by a process of degradation from some more complex material. The only source, answering these requirements, is some organic material. The difficulty is, what circumstances could possibly have determined the accumulation of sufficient organic debris to account for the vast amounts of petroleum existing in the earth's crust? The conditions must have presented an unparalleled profusion of organic life and also a complete inhibition to putrefaction. The answer seems to lie in the carboniferous age, when a heavy carbonated atmosphere favoured a prolific growth of vegetation and ensured a minimum decay in the remains which accumulated. Land animals are an impossible suggestion, and terrestrial vegetable deposits are equally difficult to reconcile with the modern facts, as petroleum presents no trace of any fibrous material which must have persisted from any land vegetation. An origin from marine vegetation presents the fewest difficulties under the assumed conditions, particularly as the absence of bromine and iodine compounds in petroleum, when compared with their presence in seaweeds, is explicable by the fact that the early seas contained no salts whatever. Of course, an origin from dead fish is conceivable, but for the existing widespread character of petroleum deposits to have come from this source we must fall back upon some cataclysmic destruction of marine fauna of whose occurrence we have no supporting data.

Assuming that organic remains did give rise to petroleum accumulation it is worth while considering the chemical and physical evidence in favour of them. Fish scales and traces of foraminifera have been found in oil deposits, and laboratory experiments show the process of transformation from these remains to be practicable, but petroleum is relatively nitrogen-free and to reconcile this fact with the comparative richness of animal remains in nitrogen involves the bridging of a large gap. The difficulty as to the nitrogen content does not arise in the case of a vegetable origin; it is only necessary here to assume that the cellular material rots away, and that the oil results from the accumulated waxes. As to whether oil or coal is the ultimate product depends solely on the conditions as to temperature, pressure, and richness or otherwise in the needed fatty material. The probable course of the decomposition of the fatty stuff is easily outlined. By contact with water and by fermentation, saponification of the glycerides results, liberating the fatty acids, and these, by loss of carbon dioxide and some water, give rise to a solid hydrocarbon mixture.

Further heating under pressure would produce liquid hydrocarbons; it is extremely probable that great pressure has been the primary factor in the whole series of changes. Some recent work on the synthesis of coal, by subjecting peat to high pressure in contact with water, in which a colloidal solution of hydrocarbons was obtained and from which, by contact with salt, the hydrocarbons were precipitated as petroleum, furnishes further evidence in favour of a vegetable origin for petroleum, and explains the presence of salt in the neighbourhood of those deposits. From these considerations, though the evidence is purely circumstantial, we may draw the conclusion that petroleum had its origin in some organic material, but whether it was animal or vegetable it is difficult to say. Possibly, the sources may have been different for different districts, and that different oil fields have had different histories.

## XII.

At some time or other, most of us have had to do with asbestos, yet how many ever give a thought as to its origin and production? Asbestos has been known and used for some thousands of years; in fact, its name "the unconsumable" we get from the Greeks. The conditions under which it is formed in nature are complex; it is found associated with certain igneous rocks which occur in many parts of the earth. Formerly, the world depended on Italy for its supply, now the bulk comes from Canada, and in the districts producing it the rocks containing asbestos consist of very crystalline peridotite, pyroxenite, gabbro, diabase, and some others. The theory for the formation of asbestos is roughly as follows: Among volcanic rocks are a series known as peridotite; these become fractured and the fracture gets filled with magnetite, on each side of which a process of serpentinization takes place, that is the peridotite is changed for several inches each way and the serpentine formed gives rise to the asbestos crystals which spread outwards from each side of the magnetite. In this process, the essential factor is the purity of the parent rock, peridotite. It being anhydrous and the serpentine hydrous, access of water is an absolute necessity. The formed serpentine, having taken up some 15 per cent of water, is softer than the parent rock, and after a while part of it crystallizes as asbestos and the remainder continues amorphous. If a piece of chrysolite be examined, the following sequence may be found: first a film of magnetite marking the commencement of the process, on either side a half inch or so of

asbestos crystals, beyond which on each side are some two inches more of serpentine, with the parent peridotite rock enclosing the whole. The crystallization is always proportionate to the serpentinization, and a well serpentinized rock may contain 15 per cent of asbestos. When altered by hydration, the peridotite is known as serpentine. During the cooling of the rock, we may suppose cracks to have been formed and that the hydrating process widened the fissures. In the course of hydration, the water carrying some of the serpentine in solution collects in the cracks, and the dissolved mineral eventually forms thread-like crystals, usually building up from opposite walls of the crack and meeting or forcing past each other at the centre. The cracks filled with asbestos fibres are usually straight, but do not occur in parallel planes; they are found crossing each other and running in all directions.

In a suitable district, the quantity of asbestos will depend on the extent of rock fracturing, as it is along those lines that the processes giving rise to asbestos take place. The essential qualities which render asbestos useful are its flexibility, fibrous structure, incombustibility, and slow conducting power for heat and electricity; it is these latter qualities which render it so useful for fireproofing and insulation. It is both spun and woven to make incombustible thread, rope, and cloth, and its value for these purposes was known to both Greeks and Romans.

The commercial value of asbestos and its softness appear to be proportionate to the water percentage. It may be assumed that all asbestos deposits had originally the same large percentage of water, but that varying degrees of heat have modified their composition. Examined under the microscope with a low power, the subdivisions of the fibres seem to be unlimited; under higher power, many very fine fibres are visible and which also seem subdivided indefinitely. The physical characters of the asbestos fibre have been always a source of difficulty in spinning them into a thread. Unlike wool, silk, or cotton, the asbestos fibre has a perfectly smooth surface, but now that the difficulty of spinning has been overcome strong thread weighing about an ounce to the hundred yards is in use. If asbestos be opened out into a flossy mass, the crystals appear to be white, but when embedded in the rock the compact fibres may have a variety of colours. The fibres may be divided into four well-marked groups. The cross fibre is commercially the best, it occurs in distinct veins and runs from wall to wall of the serpentine. The centre of the fibre is marked by a line of magne-

tite or chromite, from which the chrysotile grows exogenously into the walls of the serpentine. In length, the fibres vary from a quarter to two inches. What are called slip fibres run parallel with the fracture planes produced by the shearing of the rocks. Such shaley serpentine often carries more fibre than the cross fibre rock, but it is not so economically useful. Mass fibre is the third variety, and occurs in masses or pockets in the rock, but never in fissures. The conditions which produced mass fibres must have been different from those which produced cross and slip fibres. The fourth or last variety is known as shear fibre, and is made up of cross fibres which have been sheared by a subsequent movement of the rocks. They are usually found lying parallel with the fracture planes, but evidently altered in direction after their formation. These shear fibres are quite as strong, flexible, and fine as the cross fibres, and run often to a length of six inches. All these facts indicate asbestos to be one of the most interesting of minerals; the best supply comes from Canada as that variety contains as much as 15 per cent of water and is proportionately softer than that from Italy or Cyprus. From the hygienic aspect, asbestos mines present no adverse features as most of the work is daylight mining in open quarries. The subsequent treatment is simple, the adhering rock is removed, and the ore heated to drive off moisture; after this the ore is crushed, which breaks the bundles sufficiently to allow of a ready pulling apart of the fibres.

In discarding this old notebook, by thus sending some of its pages to our Journal, one parts with an old friend that has been a companion in many pleasant hours of wandering in scientific by-paths. That they are not more professional may be a defect in the eyes of some, but to me, I confess, their great charm has been that they have led one into fields away from the narrower outlook. Possibly, to some others they may be equally interesting; one can but hope that they may be.

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## DETACHED NOTES ON RECRUITING DUTIES—A FEW DETAILS FOR JUNIOR OFFICERS OF THE CORPS.

BY MAJOR P. H. FALKNER.

*Royal Army Medical Corps.*

SOME of the first duties to be learnt by our young officers are those connected with the medical examination of recruits; and although carefully prepared regulations, instructions, notes, authority, and so on are provided for guidance, much will depend upon his own capacity for good work.

The statement "anyone can examine recruits" can hardly be admitted. A medical examiner is a specialist in his own particular line. If he sends forward unsuitable candidates they have more chance of paper efficiency than otherwise, and the Service is being deprived of that which is most justly due to it—the best material available.

### HOW TO APPROACH THE REGULATIONS.

The regulations laid down for the *guidance* of medical examiners may, broadly speaking, be divided into two parts: those, such as the standards for height and vision, &c.—the laws of the Medes and Persians—upon which there can be no two opinions, and others where common sense is invaluable. As regards this personal discretion, surely one has only to read the regulations for opportunities, they are offered at almost every possible point; and if we persist, and are content to work as mere machines, we certainly commit a far greater error than occasional neglect of duty. If, therefore, an officer fails to interpret what is provided for his guidance only, and acts accordingly, his most useful sphere is not that of recruiting. Briefly: read your regulations with care, but use the utmost discretion in their application.

### METHOD.

Method is essential for success. Without some definite and almost automatic procedure, the rush of a busy season cannot possibly be provided for adequately. Passing recruits with precision and method means half the time and quarter the labour as compared with the ill-directed efforts of an untrained operator. For him nothing appears to "go right." The unfortunate clerk is interrupted with pointless queries—he almost must work overtime. Indeed, the depot as a whole is not exactly "a bed of roses" until the examiner's chaos is replaced by system.



When the time comes for the tyro to receive his first lessons at the various London recruiting depots, he cannot fail to observe how the examiner has adopted a certain method which he applies to his recruits. No two officers practise the same routine; because each one will have special ideas acquired early in his career. Yet the results are similar.

By way of illustration the following routine is a fairly typical one. The recruit enters the room in his blue overall. He is told to remove it. Even now it is apparent that his hearing is defective—a point upon which there must be no compromise—and a few questions addressed to him in rather an undertone relieves the examiner from further effort.

The next lad is what we require, at least such is the impression one receives; but nothing is taken for granted, of course, and he proceeds to the scale to have his weight recorded. He is not permitted to leave this position until his ears, teeth, throat, scalp, abdominal walls, genital organs, contour of limbs, and general condition of skin have all been examined. Vaccination marks, marks of identification, colour of eyes, complexion, and hair are also noted, or noted and recorded, as the case may be. Even the heart may be examined before the recruit moves from the scale board; therefore, with the exception of speech, vision, body movements, and weight, practically the entire examination can be completed before he is permitted to do so.

At first sight there is nothing to be gained by crowding so much into this first position of the raw recruit, but the raw recruiter is very apt to forget one or more details; and we find it an aid to memory, quite as simple as any other routine, completely to exhaust all possible sources for inspection and examination before position No. 2 is reached. If we complete No. 1 it is easy to remember what still remains to be done.

The weight is then taken—position No. 2, followed by a careful examination of the man's vision, which is also a test for speech—position No. 3. He is then placed in the final position and "put through" his movements, including an inspection for hæmorrhoids and fistula. Nothing further remains except to ask the clerk if his record is complete.

A skilful examiner, provided with an efficient clerk, can pass the average recruit in less than five minutes, making fewer mistakes than another who would require fifteen to discharge the lad, and still be haunted with fears of omission.

## SOME DETAILS.

*The Ears.*—Firstly, as regards function: while every recruit who shows the slightest tendency to deafness must be rejected, care is most necessary to avoid a mistake in diagnosis. Not infrequently a stupid individual fails to reply when a simple question is addressed to him; a second and similar test may also fail to make him speak, thereby leading to erroneous rejection.

Draw the ear backwards and outwards to obtain a clear view of the external meatus. If pus is present one will naturally reject the candidate; and advise him to have the matter attended to without delay, telling him of its dangers, and so forth. Unless a perforation is apparent one should, in the interests of the Service, reject the man as "temporarily unfit," thereby giving him an opportunity to become a good soldier in due course. Further, this slight extra effort on our part encourages a recruiter who has sufficient energy to keep in touch with his quarry and the fee available upon his acceptance into the Army.

Do not mistake a collection of dirty soapsuds for pus. The two are sometimes not at all dissimilar; but the disease will invariably afford a disagreeable odour when the point is remembered. If there are no signs—obvious signs—of suppuration, yet appearances not altogether above suspicion, the auriscope must be used. Before doing so ask the man how long his ear has been "running matter." The query, "Have you any running from your ears?" is quite futile. Should "wax" be visible the chances are greatly against suppuration; indeed, I have never seen the two conditions present together.

The recruit is then directed to hold the nose tightly between the forefinger and thumb, force the air downwards, and prevent its escape. He may be an "old hand" who, knowing his disability, refuses to carry out the test. A great effort will be made, sufficient to produce signs of exertion, yet no pressure is raised in the fraud's Eustachian tubes. Unless the external jugular vein becomes engorged this examination is incomplete; difficulties on the part of a recruit should double one's efforts to prove the truth. It is hardly necessary to add that pressure exerted in this way upon the inner surface of a perforated membrane generally causes an unmistakable sound as the air escapes via the Eustachian tube. One should also remember that such evidence is not always forthcoming; if the tube is obstructed the test, of course, fails. Such cases are very apt to escape notice unless special care is the

rule as regards the detection of deafness. Even so, an ear like this, containing a healthy external meatus with its due content of normal cerumen, will occasionally pass muster no matter how one arranges. It is positively impossible to make an auriscope examination part of one's routine for each recruit; but the number who fail to show definite signs of ear disease, with the orthodox tests carefully applied at all times, is so small as to form a negligible quantity.

Perhaps most important of all is a simple inspection of each mastoid process. It is not pleasant to receive official intimation that "Recruit MacDuff, passed by you on the 16th inst., has been discharged as medically unfit. Mastoid disease in active progress, &c." (the latter may be both unprofitable and unpleasant).

*Eyes and Vision.*—Make an inspection of each cornea for signs of interstitial keratitis the result of congenital syphilis; it may be done when one is recording the colour of the eyes for purposes of registration, thereby saving time. With regard to the various standards of vision necessary, they are laid down in the recruiting regulations so need not be recapitulated here.

A recruit may be exceedingly illiterate, and try to conceal the fact by attempting to read letters on the type with which he is not altogether familiar. Such a case occurred here recently.

The man, of the yeoman type (who make better soldiers than almost any other available class of recruits), read  $\frac{3}{8}$  very imperfectly with his right eye. He was afforded every opportunity to "go one better" without success. The left eye gave a standard of  $\frac{3}{8}$ . The lad was so excellent in other respects that an effort was again made with the right eye, using the same type as he had previously failed to read. The result was  $\frac{3}{8}$ , or practically full vision with each eye, and I am quite certain the record is authentic in every way.

It would be necessary to enter the realms of psychology to understand a case like this; it is mentioned to suggest care and forethought with the vision testing. The fraud who "rattled off" the other side of our test type to the full standard instead of the letters before him was a clever scoundrel who unfortunately had less vision than brains wherewith to acquire a tunic. The erratic specimen who alters his "mind" and makes good his escape by refusing to read anything is both obvious and irritating. Again, very ordinary observation will detect a man who, on entering the room, tries to become familiar with the types before they are applied to him; the poor fellow has probably tramped round from

the other depots, and one should save his valuable time by at once proceeding with the vision test.

*Teeth.*—Some one or other once said, "Teeth and little toes are rapidly disappearing from the human animal"; therefore, unless we are willing to take the matter into our own hands, to decide for or against a recruit because of his all-round merits or demerits, his physical prospects and possibilities, the problem is fairly impossible to solve.

The provision of two opposite grinding surfaces is essential; they are only possible behind and not in front of the canine teeth; they must exist or be capable of creation by efficient dental treatment. When a lad's teeth are impossible from a Service point of view, the proper treatment is rejection; it is the doubtful cases which cause (although they should not do so) doubt, anxiety, and waste of one's time and energy during the high-pressure seasons. Forget the teeth altogether and reject or pass him according to such common sense as may be available at the moment. If you like the lad before his teeth are visible, then accept him by all means, more especially if "his beef is going in the right direction." If he is a wretched, ill-nourished specimen, reject him without delay—teeth or no teeth.

Broadly speaking, a man whose teeth are defective should have a better all-round physique on entering his depot than a lad with a comparatively good set. The latter is likely to "make good" and show adequate return for the improved diet and environment still in the offing; the other is apt to make a troublesome dyspeptic crank, the bane of some unfortunate commanding officer—why train a trouble maker at the public expense?

The War Office authorities naturally refuse to lay down hard-and-fast rules upon this tooth question, because it is impossible to provide for it by regulation in any but the most superficial way: they are willing to maintain examiners capable of dealing with it; they expect "the man on the spot" to use his professional discretion—a wide discretion.

*Feet.*—The days when men were rejected for slight hammer-toes, corns, and bunions of minor degree, &c., are past and gone for ever. It must be so for obvious reasons. Even moderate degrees of flat-foot are acceptable, because the muscles upon which the plantar arch is dependent will, like the rest of our animal, improve wonderfully under the modern methods of physical culture now available in the Service.

## THE QUESTION OF NUMBERS.

We are often told that the question of numbers can in nowise concern the military medical examiner. "Circumstances alter cases," we think, and they may arise in the affairs of a nation—of our nation at the present moment—when public money is being freely expended to obtain recruits. It is not for one moment suggested that useless material is acceptable; yet as officials it is our duty to make the very most of every recruit who passes through our hands, thereby assisting instead of retarding the well-directed energy of the whole recruiting machine of which we are but a portion. If we do not do so, it is tantamount to the creation of an irregular standard likely to aggravate what may prove a very anxious matter in the near future—failure of supplies. When the War Office is inundated with candidates—about as likely to happen as universal brotherhood or perpetual peace upon earth—the regulations can be amended and administered accordingly.

Further discussion of this important problem must come from a better pen. What the writer has attempted is a brief and cursory illustration of practical everyday work, and some may say biased opinions. In closing, I have to thank the Senior Medical Officer, London Recruiting Area, for criticism and advice of what is, after all, an imperfect reflection of his own teaching and tactics in the recruiting room.

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## United Services Medical Society.

### THE SIEGE OF LADYSMITH.

BY COLONEL S. WESTCOTT, C.M.G.

AT daybreak, on October 30, 1899, I arrived at Ladysmith from England, and with my fellow passengers was greeted by the first two Boer shells to be fired into the town. They were from a 6-inch Creusot on Pepworth Hill, distant 7,500 yards north of the town. We were having a cup of coffee in the refreshment room when the first shell fell just short of it, and the passengers, running out into the road, narrowly escaped the second, which fell just beyond them.

Ladysmith consists of two main streets of villas and tin-roofed shops, and contains 4,500 inhabitants. It lies in a bend of the River Klip, 3,268 feet above the sea and 190 miles from Durban, and is surrounded by two concentric circles of heights which command it. The circumference of the outer circle is distant 6,000 to 10,000 yards from the centre of the town, and that of the inner circle from 2,000 to 5,000 yards. The outer perimeter is 33 miles and the inner 17 miles long. The season was summer and torrential rain was due in December and January.

On my arrival, the action of Lombard's Kop was in progress, and at 8.30 a.m. I accompanied a small force which had been hurriedly collected by Colonel W. G. Knox, Royal Horse Artillery, for the defence of the northern perimeter, which was unexpectedly threatened. We marched about a mile to the north, and occupied the position afterwards named King's Post. On the road we passed Mr. Melton Prior drawing battle pictures, under fire, for his paper.

After exchanging shots with the enemy for some hours we were recalled, and on the way we passed the naval 12-pounders, which had only arrived that morning. Our retiring troops were being freely cannonaded from the surrounding hills, the 6-inch Creusot on Pepworth at 6,500 yards doing most damage. Captain Lambton, however, brought two guns to bear on it, and was fortunate enough to disable it with the second shot, a providential diversion which checked the pursuit, and possibly saved the town.

As I continued to watch the retirement, Lieutenant F. E.

Egerton, Royal Navy, of "H.M.S. Powerful," who had been superintending the construction of a platform for one of the 4·7 howitzers close by, was carried past on a stretcher: he had just been fatally wounded by a Boer shell which had taken off one leg and the other foot. I accompanied him to hospital and did my best to comfort him; he was very brave, smoking cigarettes and chatting cheerily, his only regret being that his cricket days were over.

The Boer infantry stopped short of the town, but their long-range guns continued to bombard it all day. They had the ranges of the principal buildings and camps with great accuracy, and there were many hits and some marvellous escapes; for instance, while I was at lunch at the local hotel, a 6-inch shell struck the wall of the dining-room, which was crowded with officers, just below the window; the effect was alarming, the room became immediately darkened from brick dust, and brick-bats and broken glass came flying past, creating a panic among the guests and a scramble for the door. Only one officer, however, was badly hurt. He was sitting with his back to the window and was stunned by a flying brick.

The action of Lombard's Kop decided the plan of campaign. Ladysmith was to be besieged, and Sir George White ordered the defences of the inner perimeter mentioned above to be completed. On November 2 the last train escaped under a brisk fire and Ladysmith was completely invested.

On this date the garrison numbered	..	13,496
The civil population	.. .. .	5,400
Kaffirs and Indians	.. .. .	2,400
		<hr/> 21,300

The troops were:—

Naval Brigade: Two 4·7-inch, four 12-pounders, four Maxims, 284 officers and men.

Natal Naval Volunteers: Two 3-pounder Hotchkiss.

Royal Artillery: 13th, 21st, 42nd, 53rd, 67th, and 69th Batteries, Royal Field Artillery. Four 15-pounders, two 6·3-inch howitzers, two 12½-pounders (Vickers), two 9-pounders (No. 10 Mountain Battery).

Mounted troops: 5th Dragoon Guards; 5th Lancers; 18th and 19th Hussars; Natal Carbineers; Natal Mounted Rifles; Border Mounted Rifles; Natal Mounted Police; Imperial Light Horse—2,800 men.



Infantry: 1st Liverpools; 1st Devons; 1st Gloucesters (4 companies); 1st Manchesters; 1st and 2nd King's Royal Rifles; Royal Irish Fusiliers (2 companies); 1st Leicesters; 2nd Gordons; 2nd Rifle Brigade; 2nd Royal Dublin Fusiliers ( $\frac{1}{2}$  company)—6,000 men.

Royal Engineers: 23rd Field Company.

Army Service Corps: Detachments.

Royal Army Medical Corps: 4 field hospitals;  $\frac{1}{2}$  British Indian Field Hospital; No. 1 Stationary Hospital, Natal Field Force.

This force (the Natal Field Force) was under the command of General Sir George White, with General Sir A. Hunter, Chief of the Staff; Colonel E. W. D. Ward was Assistant Adjutant-General (B), (Supplies); and Lieutenant-Colonel Exham, R.A.M.C., Principal Medical Officer.

The perimeter for defence purposes was divided into four sections: A, under Colonel W. G. Knox (N.E.). B, under Colonel F. Howard (N.W. to W.). C, under Colonel Ian Hamilton (S. including Cæsar's Camp and Wagon Hill), and D, Colonel W. Royston (E.).

The cavalry, mobile artillery, Royal Engineers, and field hospitals were in the centre of the town. The stationary hospital was located in the Town Hall.

On the 31st I was placed in charge of the Convent, which had been hastily equipped with forty beds for surgical cases. During the following few days every one was busy digging shell-proof shelters, the soldiers in the regular defences, and the civilians in their gardens or in the sandy banks of the river. But it was not always that the most careful were spared. Dr. Stark, a scientist on a mineral exploiting trip, who had not left his honeycomb in the river bank for a week, on going to the Royal Hotel to replenish stores, was killed by a shell while standing in the doorway.

The puffs from some of the large guns could be seen, and were heralded by a bugler, so that the inhabitants were able to skelter to their burrows before the arrival of the shell.

Among the wounded brought to my hospital were Major Gray, R.A.M.C., fatally shot through the spleen; a man with a traumatic femoral aneurysm requiring ligature of the external iliac; and a man with a bullet wound through the leg at the level of the head of the fibula, inflicted at twenty yards' range, followed by a rare complication. There was very early infiltration of gas into the tissues around the wound, which spread rapidly upwards and downwards to the accompaniment of high fever (104° F. in twelve hours), and ended fatally in thirty-six hours in spite of constant attempts

at sterilization. A mouse inoculated with the discharge from the wound died in thirty hours. This was evidently a case of infection by the bacillus of malignant œdema.

As the bombardment continued, shells fell among the wounded, so, about 10 p.m. on Saturday night, November 4, as the result of an agreement with General Joubert, an order was circulated for the removal of the sick, wounded, women and children, and the civilians who wished, to a neutral camp about three miles on the line towards the south-east. This eventuality necessitated a rearrangement of the medical establishment:—

The following units were kept in the town:—

NO. 11 BRITISH FIELD HOSPITAL.

Lieutenant-Colonel S. H. Carter.  
Major W. W. Pope.  
Captain B. Forde.  
Captain K. M. Cameron.

NO. 18 BRITISH FIELD HOSPITAL.

Major J. F. Donegan.  
Captain J. McDermot.  
Captain W. D. Erskine.  
Captain A. E. Milner.

NO. 24 BRITISH FIELD HOSPITAL.

Major H. Martin.  
Major R. Porter.  
Major M. P. C. Holt.  
Lieutenant H. G. Martin.

Major J. F. Bateson was secretary to Lieutenant-Colonel Exham, Principal Medical Officer, Natal Field Force, and the following officers were attached to regimental units:—

Majors E. A. Burnside, J. S. Green, M. P. C. Holt, *G. Hilliard*, R. Holyoak, F. W. C. Jones, O. R. A. Julian, (*J. Kearney*), (*W. W. Pope*), (*A. S. Rose*), (*A. Y. Reilly*), F. H. Treberne, *C. P. Walker*, and (*C. G. Woods*).

Captains F. W. Cotton, (*Frost*), W. E. Hardy, *R. H. E. Holt*, *G. Hilliard*, F. S. Irvine, R. J. W. Macwhinny, (*N. Marder*), E. W. Slayter, *G. S. Walker*, and W. A. Ward.

Lieutenants N. H. Ross, J. M. Sloan, *R. Selby*, and W. B. Winkfield.

*Note.*—The officers whose names are in italics are deceased, and those in brackets, retired.

The following medical units received orders to move to Intombi, and to be prepared to receive wounded by the following evening.

Unit	Beds	Officers, R.A.M.C.	Other ranks, R.A.M.C.
No. 1 Field Hospital..	100 ..	Major R. L. Love .. Major B. W. C. Deeble. Captain F. J. Lenehan. Lieutenant W. G. Jones.	41
No. 1 Stationary Hos- pital, Natal Field Force	80 ..	Major D. Bruce .. Major J. Minniece. Lieutenant A. E. Weld. Civil surgeons, 6.	52
No. 26, British Indian Field Hospital, Sections A and B	50 ..	Major M. W. Kerin .. Captain N. Manders. Assistant - Surgeons, I.S.M.D., 4	Army Hospital Corps, 30 Doolie-bearers, 50
No. 1 Natal Volunteer Field Hospital	70 ..	Captain D. Currie .. Captain A. Campbell. Lieutenant Bowker.	V.M.S.C., 18
	— 300		

Lieutenant-Colonel E. A. Mapleton was appointed Principal Medical Officer, and Major S. Westcott, his secretary.

The packing up of these hospitals was carried on throughout the night, and the first train-load of equipment started at 8 a.m. on the 5th, the engine pushing behind.

About a mile out of Ladysmith we had the misfortune to collide with a stray ox, which overturned the three leading trucks and injured many of the Indian working party. After three and a half hours' delay we started again and arrived at camp at 12.10 p.m., being four and a half hours doing three miles. The site was on a plain through which the Klip River ran, and there were hills from 1,000 to 4,000 feet high surrounding it on the south and east, the strongly held position of Umbulwana being 4,000 yards south-east.

On our arrival we held a medical inspection of our injured doolie bearers, and placed thirty-four on the sick list, leaving only twenty-two for work. We managed, however, to get 100 beds ready by 6 p.m. when the first train load of wounded arrived, but the men, European and native, who had been working continuously for twenty-four hours, and many of them for three days, without proper food, were utterly exhausted, so that at 10 p.m. the last batch of wounded had to be made as comfortable as possible in the train for the night. The next day the pitching of the hospitals was completed and all the wounded, including 200 out of the 245 wounded on October 30, had arrived. Besides the wounded, about 1,200 civilians, European and native, were accommodated in a camp separated by the railway from the military hospital.

We had brought with us three days' supplies. The town

water supply having been cut on October 29, and that from the Klip river below the town being under suspicion, we brought six 400-gallon tanks full, collected above the town, and this system of supply was continued until we were able to purify that obtainable from the river at the camp.

After about a week's hard work we reached comparative comfort, the nursing sisters had arrived, tents had been trenched, the drinking water, which was of pea soup consistence as received from Lady-smith, was precipitated with alum, filtered, and boiled. Cooking places were got into working order and the sanitation organized, a work requiring a large staff of labourers owing to the stony consistence of the clay in which the trenches had to be dug. A gang of washermen was collected, and a bakery established.

There was no settling down, however; the wounded continued to drop in from the bombardment and from casual encounters, and on November 11 we received two cases of enteric fever, which proved to be the commencement of an epidemic which attacked over 3,000 soldiers out of a force of 12,000. Dysentery also soon commenced and progressively reached over 2,000 cases. The accommodation, and the nursing and feeding of these constantly increasing numbers soon became a difficult administrative problem. A prolonged investment was not anticipated by anyone, and it was not thought necessary to erect any permanent huts at the camp, and for the same reason, the medical units retained their individual field organization for some time; but eventually the whole camp became an improvised, constantly expanding general hospital, reaching 550 beds by the middle of December, 900 by the middle of January, and finally 2,000, just before the relief.

To provide shelter for these ever increasing numbers, tents of every conceivable pattern and size were sent out on the estimated requirements for three days ahead. Equipment was commandeered from shops and houses on the same principle, and to give some idea of our requirements I quote from a requisition of December 29.

Daily requirements:—

Beds .. .. .	10	Urinals .. .. .	5
Bed-boards for .. .. .	40 men	Feeders .. .. .	5
Mattresses .. .. .	50	Chamber-pots .. .. .	10
Pillows .. .. .	50	Soup-cans .. .. .	10
Sheets.. .. .	100	Saucepans .. .. .	2
Flannel shirts .. .. .	50	Flanders kettles .. .. .	3
Pocket-handkerchiefs .. .. .	20	Plates .. .. .	25
Drinking vessels .. .. .	50	Spoons .. .. .	50
Pails (1 gal.) .. .. .		Knives .. .. .	15
Wash-basins .. .. .	5	Forks .. .. .	15
Bedpans .. .. .	5		

As can be imagined, our wants could not always be met immediately in spite of the exceptional efforts of those responsible for supplying them; there was for instance on this day a shortage of bedsteads, bedpans, chamber-pots, feeders, spoons, and similar items of equipment.

During the early periods, the stationary hospital was used for serious cases of all kinds from the regular troops, as it was equipped with bedsteads and had all the nurses; the volunteer hospital received those of the irregulars, and the field hospitals were reserved for mild and convalescent cases placed on bed-boards and mattresses; but this system eventually became unworkable, every fresh case was a serious one, and all available equipment and personnel was redistributed on a simple decimal system in such a manner as to give as far as possible equal attention and comfort to all.

Our personnel was that allowed for 300 beds, and for the expansion to that required for 2,000 beds, a limited supply of untrained material only was available; fortunately 14 non-commissioned officers and 26 prisoners on parole from the Dundee fight, including many sufficiently recovered from their wounds, were available; they were all good men, making reliable wardmasters and nursing orderlies, and were a great relief to the men of the R.A.M.C. at a time when they were getting less than every second night in bed, and nearly half were sick. We next got about fifty volunteers from the civilians; they were of very mixed quality, and had to pick up their knowledge by experience. As the pressure of work increased and the unemployed civilians ceased to volunteer, compulsory hospital service for all able-bodied was enforced at 6s. 8d. per diem, which brought their numbers up to 128. This unwilling and unskilled labour was not satisfactory, and many of this category did not take kindly to military discipline. When this source of supply ceased, the difficulty was met by the serious measure of withdrawing soldiers from the defence, the numbers finally reaching 4 non-commissioned officers and 72 men; even in these circumstances we were very short of efficient nursing labour. We had 230 Indian and 131 Kaffir labourers; they were sufficient, but they were hard worked; 44 of the latter were constantly employed in digging graves, of which nearly 600 were required.

The following table will show at a glance the comparison between our staff and that authorized for a general hospital of an equal number of beds:—

				Our staff	War scale
Medical officers	..	..	{ R.A.M.C. 11 Civilian 11 }	22	81
			{ R.A.M.C. 21 Regimental 17 }		
N.C.Os.	..	..	{ R.A.M.C. 69 Regimental 98 Civilian 138 }	38	112
			{ R.A.M.C. 21 Regimental 17 }		
Men	..	..	{ R.A.M.C. 69 Regimental 98 Civilian 138 }	305	508
			{ R.A.M.C. 21 Regimental 17 }		
Nursing Sisters and Nurses			{ Army 5 Civilian 27 }	32	36
			{ Army 5 Civilian 27 }		
Indians belonging to British Indian Field Hospital			{ Army Hospital Corps .. Doolie-bearers .. }	..	30
			{ Army Hospital Corps .. Doolie-bearers .. }		56
<hr/>					
					86
Labourers	{	Indians	.. .. .	..	230
		Kaffirs	.. .. .	..	131
<hr/>					
					361

The dearth of non-commissioned officers is striking. The work required from them was bewildering; many duties performed by them in peace time had to be neglected in favour of the immediate wants of the sick and wounded. A large proportion of the staff was unaccustomed even to the sight of sickness, and their conversion into nurses naturally required great tact, forbearance, and supervision. The non-commissioned officers acting as wardmasters did not spare themselves; they worked until they became utterly exhausted, as many as nine breaking down out of eleven in one hospital.

The men of the R.A.M.C. and those from regiments also did well; they had the most trying work, the nursing of enteric fever and the seriously wounded. The orderlies of the R.A.M.C. felt the strain most, there were only 69, and 17 were in hospital at one time, suffering mostly from enteric fever. The nursing sisters worked nobly, and were invaluable. They were responsible for the nursing of the worst cases, and they also prepared the more delicate items of food. In one hospital alone, out of twelve, seven were sick at one time, including four from enteric fever and two from dysentery.

The native labourers required very strict supervision; they were divided into eleven gangs, each under a civilian accustomed to supervise them. Their duties included scavenging, refuse removal, grave-digging, laundry, and latrines. Twenty-two Kaffirs were constantly engaged in the manufacture of dry earth for latrines, which, owing to the consistence of the clay soil, was a very slow and laborious process. Indians were on constant duty at the latrines to apply dry earth and lime, and civilian overseers visited them every two hours to ensure efficiency.

The feeding of the garrison, including the sick, under the

conditions of a siege of unexpected duration, became towards the end a difficult problem. At the beginning, the stocks of food supplies for 21,300 souls were:—

		Military		From shops		Total
Breadstuff	..	65	..	14	..	79 days.
Meat	..	50	..	—	..	50 „
Groceries	..	46	..	18	..	64 „
Forage	..	32	..	26	..	58 „

The troops commenced the siege on full war rations:—

Fresh meat	..	..	..	1½ lb.
Potatoes	..	..	..	½ „
Bread	..	..	..	1½ „
Tea	..	..	..	½ oz.
Sugar	..	..	..	2 „
Salt	..	..	..	½ „
Pepper	..	..	..	⅓ „

supplemented by occasional and varied issues of bacon, cheese, butter, rice, jam, chocolate, limejuice, rum, and Boer tobacco at 1 lb. per man per month at a cost of one shilling.

This scale continued with slight variation up to the time of the Spion Kop reverse, when, on January 28, our rations told a tale of further delay of relief. Wheaten bread, 1 lb., of fine quality and well baked, became bread 1 lb. made from maize and wheat. Twelve ounces of fresh trek ox, tough and almost uneatable, even after prolonged stewing with salt and flour, became 1 lb. of horse or mule meat, which, after our natural repugnance had been overcome, was an agreeable change.

We had also to drink weaker tea with less sugar, and of course, we never had milk or cream—the tea ration was now  $\frac{1}{6}$  oz. and sugar 1½ oz. Limejuice was exhausted, and vinegar 2 oz. was substituted as an antiscorbutic.

A little later, wheat was reserved for the sick only, and we had mealie meal 6 oz., made into bread with starch, and two army biscuits, soon afterwards reduced to one and a quarter. The bread was black and as heavy as lead, and being quite indigestible, was discontinued, and we had our mealie meal boiled.

On Thursday, February 22, General Buller signalled that he was confident of success, and we were placed on full rations; but as day by day we continued to hear the booming of guns and the sound of volleys which seemed to get no nearer, we began to doubt. On Monday the 24th, however, we got news of Cronje's surrender, and were hopeful that this would hasten matters; but still there were no signs, and all was silent again until the following



Wednesday, when the commandoes were seen trekking in large numbers. But so uncertain were we of relief that rations had actually on the day before this event been reduced to a quarter, our food on the Tuesday and Wednesday, 27th and 28th, consisting of a biscuit and a quarter, as much horse meat as we could eat, and  $\frac{1}{6}$  oz. tea with a suspicion of sugar in each cup.

From the commencement, the garrison were compulsory teetotalers; an occasional "tot" of rum was all the troops got, and this did not last. Throughout the whole period, all other alcoholic stimulants were reserved for the sick.

The feeding of the sick was even more difficult than that of the healthy. For the first six weeks the sickness had not assumed alarming proportions (200 enteric, 200 dysentery, 200 wounded), and it was not until news had been received of Buller's check on December 15 that it was considered necessary to restrict the expenditure of comforts; but from the 19th, a daily scale was fixed which was not necessarily to be expended, but which was not to be exceeded. This scale was more than sufficient for some time, but as the number of sick continued to increase, the proportion of comforts for each patient gradually decreased.

The deficiency of milk was the first, and one might almost say, our only difficulty, excepting perhaps the want of alcoholic stimulants for the sick, and of vegetables for the convalescents.

The milk, fresh or tinned, commencing with two pints per fever patient daily, gradually dwindled, until on January 28, after the Spion Kop failure, it was 12 oz. (1,297 cases of enteric and dysentery). Finally, on February 27 there were only  $299\frac{3}{4}$  pints of fresh milk and ten tins daily of preserved, to meet the requirements of over 2,000 sick.

The following table records the principal changes in the daily scale of comforts. By bearing in mind the concomitant increase of sick, the gravity of the situation can be pictured.

		Dec. 19 to Jan. 27	Jan. 28 to Feb. 12	Feb. 13 to 28
<i>Cereals—</i>				
Oatmeal ..	..	55 lb.	.. 20 lb.	.. 10 lb.
Rice ..	..	350 „	.. 350 „	.. 120 „
Arrowroot ..	..	14 „	.. 7 „	.. 3 „
Cornflour ..	..	17 „	.. 12 „	.. 5 „
Rice-flour ..	..	20 „	.. 20 „	.. 10 „
Sago ..	..	18 „	.. 6 „	.. 3 „
Pearl barley ..	..	20 „	.. 7 „	.. 3 „
Tapioca ..	..	6 „	.. 3 „	.. 1 „
Vermicelli ..	..	10 „	.. 1 „	.. —
Total ..	..	510 „	.. 426 „	.. 155 „

<i>Meat Extracts—</i>		Dec. 19 to Jan. 27	Jan. 28 to Feb. 12	Feb. 13 to 28
Bovril .. ..	5 lb.	1 lb.	1 lb.	
Ext. carnis .. ..	11 „	4 „	2 „	
Fluid beef .. ..	2 „	1 „	—	
Ess. mutton .. ..	6 „	7 „	5 lb.	
Total .. ..	24 „	13 „	8 „	
<i>Alcohol—</i>				
Brandy .. ..	40 bott.	15 bott.	7 bott.	
Whisky .. ..	20 „	5 „	2 „	
Port .. ..	40 „	15 „	5 „	
Claret .. ..	1 „	—	—	
Sherry .. ..	1 „	—	—	
Hock .. ..	1 „	—	—	
Champagne .. ..	8 „	2 bott.	1 bott.	
Gin .. ..	8 „	4 „	3 „	
Total .. ..	119 „	41 „	18 „	
Milk .. ..	100 tins	25 tins	10 tins	

From February 13 there were only twelve bottles of spirits (seven brandy, two whisky, and three gin) for issue daily.

To overcome the difficulty of insufficient milk, I invented a fluid composed of imitation grape nuts, cereals, and the varying quantities of milk available. This is the recipe:—

Take of rice-flour, or }  
 Pearl barley flour } 3 lb.  
 Water .. .. 9 gallons.  
 Boil for two hours and strain through a fine sieve.  
 Baked flour .. .. 3 lb.  
 Water .. ..  $\frac{1}{2}$  gallon.  
 Boil for ten minutes, strain and add to the other fluid.  
 Add sugar as available up to  $1\frac{1}{2}$  oz. per pint.  
 For use—Add available milk to 6 oz. for a feed.

For the worst cases of enteric and dysentery the diet was:—

Rice-flour .. .. 1 oz.  
 Baked flour .. .. 2 „  
 Starches .. ..  $\frac{1}{2}$  „  
 Milk .. .. 12 „ (or less)  
 Sugar .. ..  $2\frac{1}{2}$  „  
 Spirits .. ..  $2\frac{1}{2}$  „  
 Beef-tea .. .. 1 pint (beef,  $1\frac{1}{2}$  lb.)  
 Beef essence .. ..  $\frac{3}{4}$  oz.  
 Vinegar .. ..  $\frac{1}{2}$  „

The following table shows its nutritive value (a) compared with (b) three pints of milk and one pint of beef tea:—

	(a)	(b)
Proteids .. ..	3.17	3.6
Carbohydrates .. ..	5.97	2.6
Fats .. ..	1.10	2.8
Water-free food .. ..	10.24	9.0

Its theoretical nutritive value compares favourably with the standard fever diet, but the recent researches of Schaumann, Funk, Holst and Fröhlich, and others, suggest a deficiency of those minute quantities of substances necessary for perfect metabolism which prevent "beriberi" and scurvy and promote growth, and of which the first only, named "vitamine," has as yet been isolated.

With the introduction of horse meat, an extract similar to Bovril was made for the sick, by boiling down 1,200 lb. of the meat in a large vat to 75 lb. of "Chevril" as it was called, and of which we used from 40 to 50 lb. daily.

We also received from 30 to 40 lb. of horse-foot jelly daily, and 300 lb. of sausage meat. Of eggs, the supply was limited and uncertain, the receipts on the last days will give an idea of the numbers commandeered:—

February 18	..	..	..	..	..	..	61
„ 24	..	..	..	..	..	..	45
„ 27	..	..	..	..	..	..	72

The convalescents had good wheaten bread to the end. Their meals consisted of bread 6 oz. and tea for breakfast, bread 6 oz. and stew (trek ox or horse) for dinner, bread 6 oz. and tea for tea, and soup made from horse flesh and bones and flour, flavoured with salt and vinegar. They could also have horse sausage meat or horse potted meat if they wished.

It will perhaps be of interest to place on record the three diets available for the different classes of sick on the day of the relief:—

No. 1.							
Beef..	..	..	..	..	..	1	lb.
Biscuit	..	..	..	..	..	6	oz.
Mealie meal	..	..	..	..	..	6	„
Sugar	..	..	..	..	..	1	„
Tea ..	..	..	..	..	..	$\frac{1}{2}$	„
Salt ..	..	..	..	..	..	$\frac{1}{2}$	„
Pepper	..	..	..	..	..	$\frac{1}{8}$	„
Soup	..	..	..	..	..	1 pt. (made from bones, horse sausage meat 3 oz., rice $\frac{3}{4}$ oz., vine- gar $\frac{1}{2}$ oz.).	
No. 2.							
Beef	..	..	..	..	..	1	lb.
Bread	..	..	..	..	..	4	oz.
Biscuit	..	..	..	..	..	6	„
Tea ..	..	..	..	..	..	$\frac{1}{2}$	„
Sugar	..	..	..	..	..	1	„
Salt ..	..	..	..	..	..	$\frac{1}{2}$	„
Pepper	..	..	..	..	..	$\frac{1}{8}$	„
Soup	..	..	..	..	..	2 pt. (made from bones, horse sausage meat 3 oz., rice $\frac{3}{4}$ oz., oat- meal $\frac{1}{2}$ oz., vinegar $\frac{1}{2}$ oz.).	



## No. 3.

Beef tea .. .. .	1 pt. (from 1 lb. beef with 1 oz. baked flour added).
Chevril tea .. .. .	1 „ (from Chevril $\frac{2}{3}$ oz.).
Patent food .. .. .	10 oz. (milk 6 oz., rice flour $\frac{1}{2}$ oz., baked flour $\frac{1}{2}$ oz.)
Arrowroot .. .. .	(Arrowroot and Colman's starch) 1 oz.
Milk .. .. .	6 oz.
Tea .. .. .	$\frac{1}{6}$ „
Sugar .. .. .	1 „
Salt .. .. .	$\frac{1}{2}$ „
Vinegar .. .. .	$\frac{1}{2}$ „
Pepper .. .. .	$\frac{1}{36}$ „

General extras on any diet: eggs as available, horse-foot jelly, Chevril tea, extra bread.

The only source of water supply both in the town and at Intombi was the Klip River, the water of which was of pea soup consistency, due to the suspension of large quantities of red mud; it was naturally suspicious in quality. It however only contained one grain per gallon of chlorine, indicating very little dissolved animal matter, and contrasting very favourably with that from a crystal stream I was ordered to report upon, near the gorge in Ladysmith, which contained fourteen grains per gallon, and that from a well in Intombi spruit which contained twelve grains per gallon, both of which were contaminated by the excreta of the large number of animals pent up in the limited space.

The arrangements at Intombi for the supply of pure water for drinking, and clear water for cooking and washing, were simple and satisfactory, the mud was precipitated by alum as long as it lasted, until December 19, when another plan which proved to be better and cheaper was adopted. Five open hogsheads were sunk in the banks of the river at different levels, in order to meet the constant variations in the volume of water, the result being that there was a constant supply of clear water from them at all states of the river. This was pumped into tanks of a total capacity of 5,000 gallons, on the river bank. Berkefeld filters, by working day and night, supplied 1,500 gallons daily for drinking; and one gallon per head, unfiltered, was also drawn for cooking and washing.

In the town the water was cleared for filtration by straining through cloths stretched on frames and strewn with wood ashes.



Three condensers, adapted from railway material, were also used as long as coal was available and for some considerable period provided condensed water.

The cooking soon became bad and monotonous; this was the fault of circumstances, and it would not be fair to blame the cooks. We had cooks and the finest ranges, but fuel was limited and the accessories of cooking unobtainable. Flour, salt, and vinegar were the only adjuncts to cooking we had; occasionally we got a little suet, but fat of any description was rare, so we were limited to perpetual "Irish stew," white soup, made of meat and flour, and brown soup, the same dish coloured with a little burnt sugar.

The supply of drugs, about which there was some anxiety, proved ample to meet all reasonable demands to the very end. In such circumstances there were bound to be some medical men who missed the facilities of a Bond Street druggist; one of them for instance actually got in, by runner, some salicylate of bismuth, there being plenty of the subnitrate available at the time. During the last week of the siege, 558 doses of astringents, 429 of purgatives, 931 of opiates, and 2,019 of tonics were used daily, and more were available if required; surgical dressings were also ample. In answer to inquiry from the principal medical officer as to my requirements on the day following relief, March 1, I replied: "I have enough surgical dressings to last until the end of the month."

On December 13 I received an urgent order to go into the town to equip and take charge of an operating theatre, which was to be held in readiness to deal with any wounded from a contemplated sortie in co-operation with Buller's attempt to break through at Colenzo. The site selected for my tents was in a gorge just off the Harrismith Road, about a mile west of the Town Hall. It was fairly protected by low hills from shell-fire, but an occasional shell did burst on the ridge, a fragment on one occasion slicing off the buttocks of a man lying in his tent with this part exposed.

I had just completed my encampment, however, when a tropical deluge converted the babbling brook into a raging torrent, which carried everything before it and my whole camp became a wreck. A bomb-proof shelter for my X-ray apparatus which was on the opposite slope of the gorge was also washed away. I, unfortunately, was not the only sufferer, a whole family—man, wife, and three or four children—were washed out of their comfortable bomb-proof home in a culvert a few yards from my tent.

I started afresh in the Congregational Church in the centre of the town, a much better place, but more exposed to the bombardment;

the nearest shell, however, during my incumbency, pitched 20 yards short and burst in the road, and, running out, I secured the trophy which was a good specimen of a 96-pounder.

As the relief column did not break through at Colenzo as expected, the sortie from Ladysmith did not take place, and I had only casual wounded to deal with. On the 17th, 3 men of the Natal Carbineers were brought in; they had been struck by a shell which had killed 6 of their comrades and 14 horses. Two of them had had parts of each leg shot off, and the third, one leg; the two first were hopeless, so I took the third and amputated the limb just below the joint; he made a good recovery and I saw him a year afterwards earning his living as a barman.

Just before Christmas I was ordered back to Intombi. Forty-two wounded had arrived as the result of the night attack by the Rifle Brigade on Surprise Hill. On December 22 one shot had killed 5 and wounded 12 of the Devons, and on the same day 4 officers of the 5th Lancers (including the colonel), and a serjeant, had been wounded. The sick also were rapidly increasing, and the principal medical officer at Intombi, who had been suffering throughout from dysentery, now had hepatitis and was unable to continue his duties.

I learned that a conference had taken place between General Joubert and General Hunter with a view to extending the boundary of the camp so as to include a spring of water, and I was sent out at once to examine it. Two convalescent officers accompanied me. We were allowed to go out unmolested, but we were sniped at until we reached the old boundary, in spite of the display of a white handkerchief. We discussed the desirability of running, but decided to continue our saunter, and it was as well we did so, as most of the shots struck just ahead of us, and we should assuredly have run into them. We complained to the Boer general, and he expressed regret that he had no control over some of the younger hot-headed men on out-post duty, so we waited a few days and then sent out some natives with a water cart; but they also were subjected to similar treatment; they were allowed to fill their water cart, but were shot at on the way back, one shot piercing the hat of the driver, to that we had to abandon this source of supply.

Christmas was not as festive as it might have been at home, but it was not forgotten. On my own part, I entertained a party of four in my tent, the refreshments including the almost inconceivable luxury of a whisky and soda. I had brought a flask of whisky from home with me, of which half still remained, so I added an



equal quantity of methylated spirit to it which was enough for four strong pegs, then my sparklet bottle provided the soda, and the result was never to be forgotten. My guests do not know to this day of my deception. We also exchanged the usual presents; I gave a box of matches and some tissue paper in lieu of cigarette paper, and received a cake of soap, all articles of great rarity and giving more joy than the costliest gift of peace time.

Before daylight on January 6, we were awakened by the cracking of musketry close by. It was the beginning of the memorable Boer attack on the Platrand, as they call it, a plateau, 2 miles by  $\frac{1}{2}$  mile, and from 3,000 to 4,000 feet high, the western end of which we called Wagon Hill and the eastern end Cæsar's Camp. It is two miles from the centre of the town, which it dominates. The hospital camp was within a mile of Cæsar's Camp, and we were able to watch this part of the operations. We could see the Boers moving on the eastern slope of the hill. We also saw the shells fired from the 6-inch Creusot sailing overhead, and we heard the whizzing of bullets which seemed quite close and some of which fell into the camp.

At about 6 a.m., the Boers on the hill became wildly excited, one man was flashing signals to Umbulwana, the great hill just over our camp, directing the fire from the guns there. Commandants were vehemently beckoning to reserves who were sheltering behind a hill on our left, from which they had no intention of moving, and all were apparently rushing for the shelter of the rocky ground. The cause was soon apparent; the 53rd Battery galloped out into the open to the north-west of us and opened fire on the slopes at 2,000 yards, and then all seemed to be quiet on the hill.

At 4 p.m., there was a deluge of rain and the Fouries Spruit at the foot of the hill, which was almost dry in the morning, became a raging torrent. As soon as the storm abated we heard volleys and cheers which we afterwards learned coincided with the successful attempt of the Manchesters to drive the Boers into the spruit, in attempting to cross which many were drowned.

The next day the Boer general sent in to request the assistance of a British officer in determining the nationality of the corpses which had been washed into the river and deposited along the banks. I was detailed, and as there was no boat I had to swim. There was some doubt about some of the bodies, but a glance at the feet was decisive; there was no mistaking the large flat foot of the Boer.



There were 25 officers and 224 men wounded in this fight, and their sudden influx into hospital caused a great strain on the staff, as there were over 1,000 cases of enteric and dysentery in addition to the other wounded and the ordinary sick.

On February 2, the Boers commenced to dam the river just below the hospital camp with the object of flooding the Ladysmith plain. They had been collecting bags of earth for three weeks previously, which they were rapidly placing in position, working each bank simultaneously. Their purpose was not discovered until the 20th, and on the 21st a naval 4.7 shelled the working parties; this stopped their work by day, but they continued it by night. We were relieved, however, before it was finished, and when I saw it on March 1 there remained unfinished a gap in the middle of only about 18 inches.

From a medical point of view the main interest centres on enteric fever, dysentery, and shell and gunshot wounds.

The various official and other publications differ in the sick returns of the siege; the following table was compiled in my office at the end of the period.

ADMISSIONS AND DEATHS FROM OCTOBER 30, 1899, TO FEBRUARY 28, 1900.

*Admissions.*

OFFICERS						W.Os., N.C.Os., AND MEN					
Enteric fever	Other fevers	Dysentery	Injuries in action	Other diseases	Total	Enteric fever	Other fevers	Dysentery	Injuries in action	Other diseases	Total
67	69	56	67	203	462	1,702	1,392	1,812	684	5,083	10,673

*Deaths.*

10	—	1	8	1	20	372	1	108	77	25	583
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This table does not truly represent the sickness of the siege; the spirit and determination of the troops was so fervid that I am convinced that double the number would have been admitted to hospital under peace conditions; men would not go sick as long as they had a leg to stand upon. As an instance of this I remember a Natal volunteer dying eighteen hours after admission to hospital from a perforated enteric ulcer; he had done his duty throughout the full course of this disease. The numbers returned as enteric fever (67 officers, 1,702 men) do not fully represent the prevalence

of this disease; there were admitted for "other fevers" 69 officers and 1,392 men, and we may reasonably attribute 75 per cent of these to enteric infection. Some of the dysentery cases were also without doubt enteric, and there must have been many ambulant cases. The diagnoses were in all instances clinical, and paratyphoids could not be differentiated. We had not the means of carrying out either blood cultures or "Widal" reactions, so that this estimate of 2,864 is in all probability not exaggerated.

It will be of interest to consider shortly the mode of development of this epidemic and the means of prevention in similar circumstances in the future.

Enteric fever is spread by the infective excreta of a "carrier": (1) In drinking water; (2) on food, to which it has been conveyed by flies; (3) by commensal infection.

At the commencement of the siege, there must have been many "carriers." The town was re-occupied by troops in May, 1897, and in the next three years there were among them:—

In 1897	..	..	17 cases of enteric fever.
„ 1898	..	..	118 „ „ „
„ 1899 (to October)	196	„	„ „ „

The civil population suffering proportionately.

That the drinking of infected water was responsible for many cases, if at all, seems improbable; the greatest care was taken to provide safe drinking water for the troops, and drinking from foul sources would be exceptional. The pail-system of removal of excreta was carried out, so that there was no constant pollution of the river by sewage, and as the enteric bacillus is soon killed by exposure to the sun and soon crowded out by associated *B. coli* any adventitious misplaced excreta, if infective, would in most cases become harmless before being washed into the river by storm water. Infective excreta also would soon be carried down the river beyond the town, and would be extremely diluted by the immense volume of water. The outbreak had not the characteristics of a water borne epidemic; its progress was in geometrical proportion.

The maximum prevalence is during the hot season, when germs grow prolifically; this was the period of the epidemic under review, which is also the fly season. Flies breed almost exclusively in horse, mule, cow, and other animal dung; there were large numbers of these animals occupying a restricted space, and scavenging was neglected; the conditions were therefore favourable for fly breeding, and there were plenty of them.

Flies which have fed on enteric excreta deposit enteric germs with their specks, of which there are fifty daily, for three weeks afterwards, and it is reasonable to attribute a proportion of the cases to infection in this manner. But it is to the commingling of fresh arrivals with the carriers of antecedent epidemics, under the crowded and insanitary conditions of the siege, that I attribute the majority of the infections; the commensal cause, and the one most difficult to legislate for under service conditions.

We may, in future wars, be able to provide pure drinking water, and prevent flies by destroying the materials in which they breed, but we cannot provide for the personal cleanliness necessary to render the carrier innocuous. Something can be done by educating all ranks, including cooks, to wash their hands before handling food, but the means will frequently not be available under service conditions. The elimination of carriers would settle the difficulty; this is now being done in the case of sufferers who have been discharged from military hospitals, a measure which has probably contributed largely to the diminishing incidence of the disease. But there would still remain undiscovered carriers, including early and ambulant cases, and as campaigns progressed, this class would increase—there are reservists, recruits, territorials, colonials, civilians, and camp followers to be considered; this plan is therefore impracticable in war.

It is fortunate, in these circumstances, that we possess another potent weapon of defence in inoculation; 1,700 of the troops in Ladysmith had been inoculated from two to eleven months previously, but there is no record of the number of doses they received nor of the potency of the vaccine. These were the early days of inoculation, and the degree of heat then used in sterilizing the vaccine is now considered to diminish its efficiency.

The incidence of the disease was nevertheless favourably influenced, more in some groups than in others, according to the varying virulence of the types.

There were 1,868 cases of dysentery; they were all bacillary and a great many merged into enteric fever during the course of the disease. Hepatitis and hepatic abscess were not frequent complications; the deaths from hepatic abscess in relation to the total deaths from dysentery plus hepatic abscess being 1 in 16. Abscesses were always pyæmic in origin and multiple.

The remarks on the causation of enteric fever are applicable to dysentery, but there are fewer carriers than in the case of enteric fever, as the dysenteric germ disappears rapidly from the excreta of convalescents.

## WOUNDS.

Sixty-seven officers were wounded in action, with 8 deaths; 684 other ranks, with 77 deaths. Of these wounds, about 100 were from shell-fire and the remainder from rifle-fire. It is estimated that 16,000 shells were fired into the town, which, taking an average of 35 lb. per shell, gives a total of 250 tons, or  $2\frac{1}{2}$  tons per man hit.

The wounds caused by the Mauser bullet were surprisingly humane, and did not fulfil expectations based on experiments on carcasses. In a general sense the wounds decreased in severity with the range; at quite short ranges, so-called explosive effects were observed, but at ranges over 400 yards a small, cleanly punctured track, with inconsiderable fissuring of bone or destruction of soft tissue, was the rule.

Wounds at first healed normally, but as the siege progressed, as the result of deficient food of poorer quality and the enervating effects of restless and watchful nights, healing was progressively retarded, until towards the end, with scurvy as an additional factor, neither wounds nor fractures made further attempt at repair.

Rumours were at one time rife that poisoned bullets were being used by the Boers, as some had been found in their trenches which had been coated with a green waxy material; this, however, proved, on examination, to be merely a lubricating material discoloured by verdigris, and further suspicions were allayed.

*Wounds of the Abdomen.*—Many surgeons went to South Africa anticipating grave lesions of the abdominal viscera from the high-velocity bullets, and a wide field for abdominal surgery; but after a short experience they were surprised to find a large percentage of undoubtedly penetrating wounds giving rise to no symptoms, and to find that, generally speaking, the chances of recovery were greater without surgical interference. About 50 per cent of penetrating wounds were associated with symptoms pointing to the injury of a particular viscus; 25 per cent had doubtful symptoms, and 25 per cent no symptoms at all. Of the first about 50 per cent died; of the second about 10 per cent, and of the last 3 per cent died during convalescence from unexpected peritonitis.

There were many interesting cases, of which the following is an instance: Private L. Track of bullet antero-posterior through ascending colon. Galloped half a mile and walked a quarter of a mile, leading his horse, before wound was dressed. Lay on the field all night, and next day jolted for eight hours in



a wagon on his way to hospital. On third day collapsed; abdominal pain, temperature  $99.2^{\circ}$  F. Starved for ten days, and discharged cured twenty-four days later.

*Wounds of the Skull.*—Fractures of the bones of the skull and damage to the brain tissue proved to be less severe than on the dead body. The mortality was only 33 per cent. They frequently were accompanied by interesting mental or nerve complications according to the region involved. I will record a few illustrative cases :—

Trooper H. Entrance  $1\frac{1}{2}$  in. to the left of occipital protuberance. No exit. Stupid; apathetic; pain over *right* mastoid; maniacal attack on twenty-third day; rational and quiet a few days later. Complete recovery.

Trooper McL. Gutter fracture  $2\frac{1}{2}$  in. long on left side of vertex. Almost quite unconscious. Paresis right arm. Incontinence of urine and fæces. On ninth day completely recovered.

Trooper McK. Entrance through right eye. Bullet passed obliquely upwards and backwards, frontal bone fissured. Drowsy; delirious; incontinence of urine and fæces. Right eyeball removed. For three days had Jacksonian epilepsy beginning on left side of mouth and passing to left extremities. Wound septic. On ninth day fits ceased. Fragments of frontal bone came away or were removed at intervals during month. Recovered completely.

Corporal H. Shot at two or three yards' range. Entrance small, just above and behind left mastoid process; exit through left orbit. Frontal bone on that side blown away; whole skull shattered into loose fragments, brain reduced to bloodstained, almost fluid, mass. Lived nearly one hour.

Private H. C. Entrance at antero-inferior angle of left parietal. Exit on opposite occipital region. Could not be roused. In a few days was conscious; but amnesia, loss of memory, nervous depression, and vertigo persisted. No motor paralysis. Well enough to be sent home.

*X-rays.*—We were fortunate in having Serjeant-Major F. Bruce as an expert; he had brought his apparatus and his experience direct from the Soudan Campaign. The machine had a good secondary coil, and we borrowed cells from the railway, which gave 12 to 15 volts and 8 to 10 amperes, unfailingly, throughout the siege. There were some apple-green tubes by Newton which were useless, and some three-electrode pink tubes by Deane; one of which was very good and used almost exclusively. We had also two good platino-cyanide screens and a Mackenzie Davidson

localizer. Lumière plates were used for radiographs, and Burroughs, Wellcome and Co.'s Ilford developing soloids. By the screen 87 cases were examined, and 29 radiographs were taken. Of the screen examinations, 56 were for bullets or shell, and the remaining 31 for fractures. The 29 radiographs were for the localization of bullets for extraction.

The record of a memorable siege would be incomplete without a word of tribute to the high qualities of Sir George White, which inspired Britons, soldier and civilian alike, with absolute confidence ; to Colonel E. W. D. Ward (now Sir Edward Ward, Bart.) to whose genius in the organization of our food supply the saving of Ladysmith was equally due, and to the officers and men, who, in spite of frequent disappointments, stuck cheerfully to their posts, sharing, on the same footing, starvation and danger for the honour of their flag.



## Clinical and other Notes.

### EXCEPTIONAL INITIAL SYMPTOMS IN A CASE OF PNEUMONIA.

By MAJOR E. M. MORPHEW.  
*Royal Army Medical Corps.*

PRIVATE P., aged 17, was brought to hospital on the morning of June 21, 1912, and admitted. His face was somewhat cyanosed, respiration very rapid (40 per minute), loud, but not stertorous. Pupils very small and fixed, not responsive at all to light. He was with difficulty roused from a semi-conscious condition, and no history could be obtained from him. Pulse 160, extremely weak and soft, at times almost imperceptible. Skin warm, not moist or clammy; extremities warm. Temperature 101.6° F. There was no distension or retraction of the abdomen, but there was rigidity of the abdominal muscles and restriction in movement. There was no decrease of liver dullness nor could anything be felt on palpation, but examination seemed to cause great pain; the tongue was wrinkled, dry, and furred. There was slight deficiency in resonance over the right apex, where the respiratory murmur was also a little harsh.

The following history was obtained from the non-commissioned officer in charge of his room and from his comrades: He was quite well on the 20th till tea-time. He went to bed at 5.30 p.m., complaining of cold shivers, pain in the stomach, and feeling sick. At 9 p.m. he was groaning, and asked for a drink and some water was given him. At 11 p.m. he vomited a large quantity of unchewed meat and potatoes. At 5.30 a.m. he vomited again, and appeared very drowsy and helpless. At no time during the night could he be completely roused; he seemed dazed. While being taken to hospital on a stretcher he passed a watery motion and was quite helpless.

A civilian medical practitioner kindly saw the case in consultation with me, there being no other officer of the R.A.M.C. at this station. The cause of the patient's critical condition could not be definitely stated, and symptomatic treatment was adopted. Strychnine and atropine sulphate were given hypodermically, and strong coffee per rectum. Occasionally vomiting of liquid matter only took place. A small quantity of urine drawn off contained neither albumin or sugar. No improvement taking place in the character of his pulse, more strychnine was given, and at 5.30 p.m. there was some slight improvement in the quality of the pulse. The pupils were not so contracted and reacted slightly. There was some improvement, too, in his mental condition,



he could be roused more easily. The vomiting continued. There were no abdominal symptoms which called for operative interference.

At 9 p.m. his pulse again became extremely weak and at times almost imperceptible. Strychnine and digitalin were given, and at 1 a.m. on the morning of June 22 another injection was administered. A change now took place in his mental condition; he became restless and occasionally delirious; he resented being touched anywhere, saying it gave him pain. The plantar reflexes were increased; patellar reflexes were absent. The fingers became cold and cyanosed, but the cyanosis of the face was not so marked. At 7 a.m. some slight improvement in the character of his pulse was observed; the rate had fallen to 140, and it was less compressible. Bilious vomiting occurred occasionally.

The notes on the case of June 22 read: "Noticed an improvement, though very slight; he is irritable with occasional muttering; there is hyperæsthesia of the lower extremities. Pupils not so contracted, and react to light. Abdomen not rigid, and there is more movement. There is a peculiar mottling of the skin over the chest. Breath sounds over right apex harsh and accompanied by a peculiar click. Percussion note somewhat deficient; no difference in the percussion note can be detected at the back, but there are harsh breath sounds, increased vocal fremitus and vocal resonance on the right side. No cough; respiration 48. Tongue dry and brown, vomiting of green bile. Urine, 14 oz., drawn off. Owing to the irritable condition of the stomach, nutriment enemata only are being given, and a mixture of bismuth and acid hydrocyan. dil. Improvement in character of pulse maintained. No injection has been given since 1 a.m."

At 8 p.m. on June 22 the character of the pulse had been entirely changed and gave no cause for further anxiety. On the 23rd the usual signs of pneumonia were observed in the right lung, and later on the base of the left lung was also involved. The course of the disease was not typical of either form of pneumonia.

The interest in this case lies in the exceptional, grave, and complicated symptoms which ushered in the disease, the late appearance of signs of pneumonia, and the fact that it was principally the nervous, circulatory, and digestive systems that were involved at first. It is a question whether the more correct diagnosis would not have been influenza. There are various types of influenza, different systems being affected; but fortunately all are rarely affected at one time, as in this case.

The patient's recovery was uneventful.



CÆSAREAN SECTIONS AT THE LOUISE MARGARET  
HOSPITAL, ALDERSHOT.BY MAJOR E. RYAN.  
*Royal Army Medical Corps.*

DURING the last three years there were six cases of Cæsarean section and all were successful; the following conditions were the causes necessitating operation.

Two cases were operated on by my predecessor, Major Sebert Green, R.A.M.C., for extremely contracted pelvis, three cases by me, and one by Captain P. G. Easton, R.A.M.C.

My cases were as follow :—

(1) Mrs. W., aged 38, was admitted into hospital in labour at 10 p.m. on August 28, 1911. I was called to see her next morning, as although labour pains were fairly strong and frequent the head (which was the presenting part) was not making satisfactory progress.

On vaginal examination the os was found dilated to about the size of half a crown, the membranes had ruptured, and the head could with difficulty be detected high up, and a tumour was found occupying the lower uterine segment completely surrounding the cervix and os, and evidently preventing full dilatation as well as natural labour.

Assisted by Captain Easton I operated on her an hour later, and when the child was removed the tumour, which was an interstitial fibroid and as large as a foetal head, was found to occupy the whole of the lower portion of the uterus. Enucleation of this fibroid being impossible supravaginal hysterectomy was done. The mother and child did well.

(2) Mrs. M., came to see me in October, 1912, with the following history. In 1911 she was delivered of a premature baby (seven months) at Guildford Hospital. She stated the baby's head had to be broken up before it could be brought away; she was advised by the doctor who delivered her that if ever she became pregnant again she should go to a hospital at the sixth month and have labour induced. I examined her, and on doing pelvimetry I found she had a very flat pelvis, true conjugate  $2\frac{1}{4}$  in. She bemoaned her fate of not being able to have a living child, so I advised Cæsarean section, which she gladly accepted.

The operation took place on February 2, 1913, and the mother and daughter did well.

(3) Mrs. M. This woman came to see the lady superintendent in July, 1913, to make arrangements for coming into hospital for her confinement. Being very small and of a general rickety appearance I was asked to see her.

By pelvimetry the following measurements were made out: Inter-costal,  $9\frac{1}{2}$  in.; interspinous, 9 in.; external conjugate, 6 in.; true conjugate,  $2\frac{1}{2}$  in. The sacral promontory was very easily felt.

Cæsarean section was done on September 11, mother and child did well.



The latest case, Mrs. P., whose history is exactly similar to No. 2, noted above, was operated on by Captain Easton on January 9, 1914. The stitches were removed on the eighth day. Mother and child are doing well.

In performing Cæsarean section I do not think there is any occasion to wait until labour sets in, and our plan at this hospital is to endeavour to anticipate it by two or three days. On the morning of operation the vagina is douched with an antiseptic and then plugged lightly with antiseptic gauze, so that when the child is extracted the fingers, when pushed through the os to dilate it with a view of draining the lochia, cannot be contaminated. One of the essential points for the success of the operation is quickness in extracting the child; the assistant at the same time pushing the uterus out through the abdominal incision, gripping the cervix, and thus controlling hæmorrhage.

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#### A NOTE ON THE USE OF LIQUID PARAFFIN.

BY CAPTAIN P. G. EASTON,  
*Royal Army Medical Corps.*

THE object of this note is to lay stress on the valuable properties of liquid paraffin, which are only beginning to be appreciated at their true value.

A case that came under my care recently will illustrate one of its uses. A field officer came to see me towards the end of October, 1913, complaining of abdominal discomfort and flatulence. On examination he was seen to have a somewhat furred tongue, and his abdomen, on palpation, was distinctly full and tender over the right iliac fossa. His pulse and temperature were normal. He said that he frequently had pain over the right side of the abdomen, and that the pain, which was of an "aching" character, sometimes shot down the right leg. This last observation made one think of a possible stone in the kidney or ureter, but an X-ray examination showed no shadow. His other symptoms might have been due to the dyspepsia of chronic appendicitis as described by Moynihan, but there was nothing sufficiently acute about them to warrant an exploratory laparotomy. Instead, he was placed on half-ounce doses of liquid paraffin three times a day between meals, and he was again carefully examined in five weeks' time. The change in his condition on this second occasion was very striking. The tongue had cleaned up, the appetite had improved, and he felt generally much fitter. On examination there was still some fullness on the right side of the abdomen as compared with the left, but all the tenderness had gone. I would explain this case, which is typical of many, by supposing that the patient was really suffering from intestinal stasis of moderate degree, which was most marked round the cæcum, and that the liquid paraffin



acted by accelerating the passage of the contents of the large gut. The patient has now completely recovered, but is still continuing to take a small dose of the paraffin every night at bed-time.

Another class of case in which liquid paraffin will be found of service is that of the florid and healthy looking officer who has served some years in the Tropics, and who is firmly convinced that he is suffering from "liver." He usually makes an apology for coming sick, as he admits that he looks in robust health, but at the same time he assures one that his inmost feelings are the reverse of healthy, and he finishes his story by a request for a good pill and a "liver tonic." On examination there is frequently little to be made out, but occasionally one or other portions of the colon may be detected as being somewhat distended and possibly tender on deep pressure. Place this class of patient on liquid paraffin for a week in half-ounce doses three times a day, and my experience is that he will report himself as feeling vastly improved, and as having lost his "liverish" feeling at the end of that time.

The chronic constipation of children and infants often yields most easily to liquid paraffin in small doses, given regularly three times a day at first and reducing the dose to once daily at bed-time. Thus a breast-fed baby of 6 months old was practically cured of its constipation by the administration of fifteen drops of paraffin added to a teaspoonful of water and given three times a day before its bottles. The advantages of paraffin for children are its ease of administration, as it is almost tasteless when given with milk or water, and the mildness of its action.

The last class of case I would like to refer to is that of patients who have undergone abdominal operations for whatever cause, and who are apt to suffer from constipation while still confined to bed. Paraffin in these cases acts mildly and yet efficiently.

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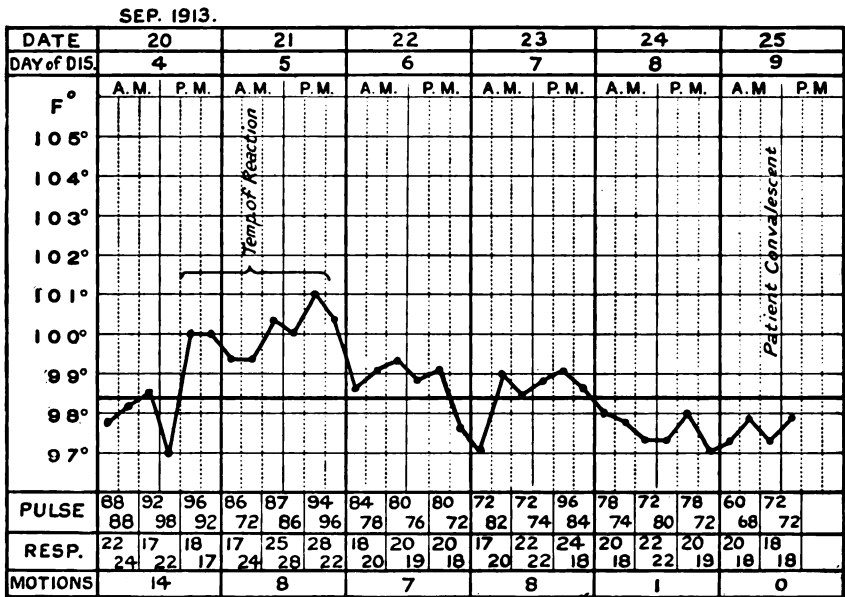
#### CASE OF CHOLERA TREATED BY HYPERTONIC SALINE INFUSION.

BY CAPTAIN W. E. C. LUNN.  
*Royal Army Medical Corps.*

THIS short account of a case of cholera treated by Lieutenant-Colonel Rogers' method, is written to emphasize the importance and immediate excellent result of his treatment.

On September 17, 1913, at midday, one of the hospital orderlies was brought into the station hospital, Lahore Cantonment, with a history of vomiting, severe diarrhœa, and pains in his legs since 2 a.m. The case was looked upon with suspicion, as several cases of cholera had occurred amongst the native population in the neighbourhood. The symptoms and physical signs on admission were not sufficiently typical to make an immediate diagnosis of cholera.

He was placed under observation, and at 5.30 p.m. I was called by the assistant surgeon as the patient appeared to be much worse. The clinical picture presented left no doubt as to the diagnosis. Two orderlies were massaging the patient's limbs and calves. He was loudly complaining of cramps in his legs; the bed-pan was no sooner removed than it was required again; at intervals the patient had uncontrollable vomiting, ejecting the green rice-watery fluid some yards up the ward and over the receptacle held ready. His thirst was intense.



He was given plenty of water pinked with potassium permanganate, meanwhile everything was got ready to give him hypertonic saline solution intravenously. The patient now showed almost every symptom so graphically described by Manson in his book on tropical diseases. The pulse got faster and weaker until it was barely perceptible, the skin of his hands was covered with rugæ and shrivelled, the veins were bloodless and difficult to find, his mental condition was semi-comatose. The saline infusion was satisfactorily commenced at 7 p.m., and continued for twenty-five minutes; two and a half pints were injected. The patient at once responded to the treatment. He no longer complained of cramps, his vomiting stopped, his diarrhoea decreased and his mental condition cleared up rapidly, and he actually began to make jokes to his friends, the other orderlies. The pulse-rate fell from 144 to 110 per minute. From this point onwards the patient made an almost uneventful recovery:

for the next two days his meat was permanganate pills and his drink pink water. On the fourth and fifth days of his illness he had a reaction temperature as shown on the chart; this caused him no inconvenience.

It is useless to dilate further on his symptoms, on the isolation of the cholera bacillus, or on the dates on which he first passed urine and formed fæces; they followed the typical textbook course. The marked improvement as the injection was given, compared with the usually rapid and fatal course of cholera cases, convinced one of the absolute necessity of having an intravenous injection apparatus and tabloids to prepare the solution ready for immediate use.

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### SOLDIERS' TEETH.

By MAJOR A. W. HOOPER, D.S.O.

*Royal Army Medical Corps.*

MUCH has been done of recent years to reduce sickness in the Army, but the possibility of making further improvement by more attention to soldiers' teeth has not obtained the consideration it deserves.

The highest degree of efficiency is only to be obtained by attention to the use of all the bodily functions, and is not attained when the teeth of so many soldiers, from pain and sensitiveness due to decay, are inadequately used in mastication. It is not easy to exaggerate the importance of dental caries and the harm done by the absorption of pus and microbes from the cavities of suppurating teeth, when dyspepsia, diarrhoea, appendicitis, adenitis, tubercular disease, rheumatism, and many minor septic troubles may be due to it.

The consequences of pain and malnutrition due to teeth are also a potent cause of inefficiency on manœuvres and active service.

With all the care that is given to sanitary matters, we seem to be lamentably lax when it comes to the hygiene of the mouth. The persistent neglect of dentistry as an important phase in the duties of an army medical officer is overlooked, and we neglect almost entirely a subject of great practical importance and utility to the service.

Dental caries is the most prevalent of all diseases of soldiers; it is admitted that decay can spread from tooth to tooth, and may be prevented by treatment from doing so. It appears also reasonable to infer that caries may also spread from one person to another; in other words, caries is to be looked upon as a contagious disease.

The means we have at present of combating this disease consist of the expensive method of getting a local dentist to stop a few teeth and extracting teeth whether necessary or not, a duty that is expected to be done by us. Neither of these methods touches more than the fringe of the subject.

What practical methods, then, can be suggested for dealing with the matter? I venture to suggest:—

(1) That every officer, R.A.M.C., should have a course of lectures on the treatment of teeth when he enters at the Royal Army Medical College.

(2) That all non-commissioned officers and men in the Army should have lectures on the importance of looking after their teeth.

(3) That a dental department should be instituted at all large hospitals, which would cost very little.

(4) That the staff should consist of an officer, R.A.M.C., qualified to do dentistry as far as it is necessary in the Army, and that he should train certain men who have passed for A.F., C. 344, to do the work of filling simple cavities and cleansing teeth—or, in other words, I should like to see “Dental Attendants” added to the lists of special subjects open to the Nursing Section.

If the objection be raised that we shall add a number of unqualified dentists to the country when these men leave the service, I would say in the first place that the number is already large, and occupied in doing doubtless useful work which qualified dentists are all too few to touch. Secondly, one does not propose to extend the teaching beyond the duties mentioned, and has no object other than the importance of the subject to us.

Should a man on leaving the Service see his way to qualify as a dentist, I can see no objection to it; but he could hardly expect to earn a livelihood by stopping teeth without more knowledge of the other branches of the subject, and at the worst the law could prevent him from practising as a dentist.

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## HOSPITAL ARRANGEMENTS IN AN INDIAN TROOP TRAIN.

BY MAJOR E. E. POWELL.

*Royal Army Medical Corps.*

LANDING in India after an absence of fifteen years was an experience which fell to my lot recently, and I thought that a short account of two innovations noticed by me since my first tour of duty there, might not be without interest to the readers of the Journal.

Disembarking at Karachi, I received orders to leave that evening in charge of a troop train proceeding up country to Ambala, dropping details for Mooltan, Delhi, &c., *en route*.

The train was a long and heavy one, the rank and file being accommodated in bogie carriages of a comfortable type, and the officers in some of an older four-wheel pattern, in which the smooth gliding motion of the eight-wheeled bogie was conspicuous by its absence.

The first innovation was a carriage set apart as a hospital, and so



designated. It was not especially fitted as an ambulance coach, but had mattresses, blankets, pillows, and towels, with a medical companion and water-bottle, all under the charge of a European non-commissioned officer. The seats ran longitudinally, at the sides and down the middle, upon which fairly comfortable beds could be made up. I found this to be most useful in the treatment of one or two cases of colic which occurred during the journey, the men being taken into the hospital carriage and given lying-down accommodation for the night. This was quite easy to arrange, as halts at wayside stations were comparatively frequent, owing to our train having a very liberal time allowance in which to complete the journey, and also being occasionally shunted to allow faster trains to pass. The idea of a hospital on these trains is, I am told, a new one, and it distinctly commends itself.

It has occurred to the writer that it would be quite easy to have an ordinary first or second class carriage fitted as a hospital for use on troop trains, after this fashion; one end would accommodate, if necessary, four lying-down cases on the ordinary berths. Accommodation for an assistant surgeon and European hospital orderly would be arranged for in the middle compartment of that carriage, this part being fitted with a few racks for stock mixtures, which appear more effective than compressed drugs, and drawers for a little surgical material. A gas-heated stove, and a water tap with basin and sink, would be of great use.

An electric bell push might be provided over each patient's bed to communicate with the assistant surgeon should necessity arise. A coupé or similar compartment at the other end would be set apart for any women or children who might fall sick during the journey, from an indiscreet indulgence in bananas and mineral waters, or other causes.

Lavatory and w.c. accommodation would be required at both ends of the carriage, and means of getting a shower-bath would add much to comfort on a hot journey. The hospital carriage should be reserved entirely for hospital cases, no other person being allowed to travel in it, in order to ensure quietness and plenty of ventilation for the sick. A man taken suddenly ill with diarrhoea or colic could then be made as comfortable as circumstances permitted and probably a fair night's rest ensured, instead of the wakefulness and discomfort to both the sick soldier and his comrades entailed by a long night's journey in an ordinary carriage.

The hospital equipment would remain in charge of the non-commissioned officer above mentioned, and would not be removed at the end of the journey.

The assistant surgeon and a European hospital orderly would form an efficient staff in ordinary circumstances.

Accommodation for officers would not appear to be necessary, as cases of sickness *en route* very rarely occur among them in comparison to those among young soldiers just arrived in the country.

The situation of the hospital would be best in the middle of the train

owing to the comparative quiet and smoothness of travelling. The w.c. and lavatory accommodation in the hospital carriage of the writer's troop train (an ordinary third) was not all that could be desired, but it is anticipated that the accommodation provided in ordinary first and second class carriages would prove sufficient after their conversion into hospitals.

The above ideas are, I need hardly say, much in the rough, but details could be easily worked out, and from what I saw on the journey referred to, a carriage converted as indicated above would prove most useful and an undoubted boon on troop trains in India.

The second novelty was one connected also with the inner man, but of a pleasanter sort. It consisted of a travelling coffee-shop, stocked and managed by natives under the supervision of a European serjeant.

In this, tinned food, jams, biscuits, mineral waters, &c., all of excellent quality, could be obtained at a reasonable cost, well within the means of the soldier, thus lessening to a large extent the chances of a sudden outbreak of intestinal disease from a too persistent indulgence in fruit of all sorts by those newly arrived.

It is undoubtedly a progressive step, the provision of wholesome etceteras to the rations having much to do with the success of the journey from a medical point of view.

I find nothing to criticize in the new arrangement, except that, as in the case of the hospital, the coffee-shop should be established in a carriage by itself, with a serving counter, and hot water and means for washing up should also be provided. In the case under consideration one half of the carriage was occupied by the coffee-shop and staff, and the other by the troops, the latter finding their rest at night considerably disturbed by the conversational powers and other noise-producing proclivities of the Aryan brother. However, as it was, the coffee-shop on this train proved a great boon not only to the rank and file, but also to the officers, who were indebted to this arrangement for obtaining an excellent tea *en route*, and on the morning of the second day a good breakfast on a railway platform where no other means of obtaining sustenance existed, dining cars not being provided. Biscuits and tepid soda water, &c., are apt to pall as a means of refreshment during a long journey, even with the "&c." The dining car service, now so common to India on all long-distance trains, has had a great effect in lessening the efficiency of provision of meals at the halts during a journey. In these circumstances, therefore, the coffee-shop proved a veritable blessing.

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## SHAKESPEARE ON SYPHILIS.

BY COLONEL F. SMITH, D.S.O.

*Royal Army Medical Corps.*

THE Bard had such an astounding knowledge [of almost everything under the sun that it is not surprising to find him possessing a clear idea of the clinical picture of tertiary syphilis. But there are many people who never read Shakespeare, and to them this extract from one of the plays may be of interest. The satire is lovely.

*Timon* (to Alcibiades) :—

“Then what should war be? This fell whore of thine  
Hath in her more destruction than thy sword,  
For all her cherubin look.”

*Timon* (to Phrynia and Timandra, mistresses to Alcibiades) :—

“Consumptions sow  
In hollow bones of man; strike their sharp shins,  
And mar men's spurring. Crack the lawyer's voice,  
That he may never more false title plead,  
Nor sound his quilllets shrilly; hoar the flamen,  
That scolds against the quality of flesh,  
And not believes himself: down with the nose,  
Down with it flat; take the bridge quite away  
Of him, that, his particular to foresee,  
Smells from the general weal: make curl'd-pate ruffians bald;  
And let the unscarr'd braggarts of the war  
Derive some pain from you: plague all;  
That your activity may defeat and quell  
The source of all erection.—There's more gold :—  
Do you damn others, and let this damn you,  
And ditches grave you all!”  
 (“*Timon of Athens*,” act iv, scene 3.)

MODIFICATION OF A METHOD OF FIXING EXTEMPORIZED  
SPRINGS TO A FARM WAGON WITH SPLAY SIDES FOR  
THE CARRIAGE OF WOUNDED.<sup>1</sup>

BY LIEUTENANT-COLONEL H. E. R. JAMES, C.B.

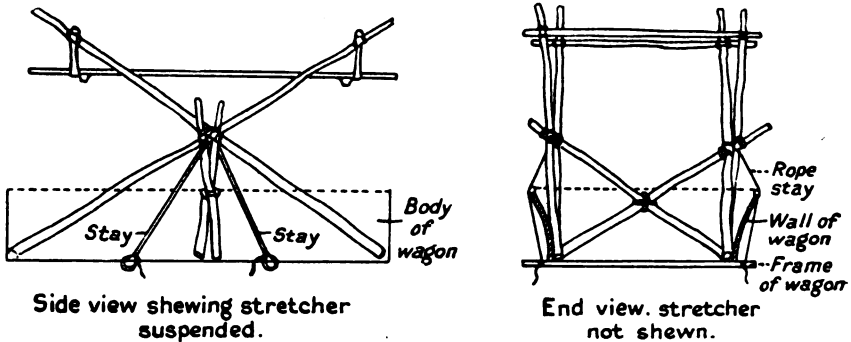
*(Retired Pay.)*

IN wagons with splay sides, such as are found in the Salisbury Plain district and elsewhere throughout the country, it is not possible to obtain a satisfactory bearing for the lashing of the poles, forming the springs, to the sides of the wagon, so as to keep the two sets parallel and vertical. In this case it is necessary to construct an independent frame, which will fit inside the body of the vehicle and which can be kept from

<sup>1</sup> Cf. para. 340, “*Royal Army Medical Corps Training*.”

moving by means of stays. The system is shown in the accompanying sketch.

The pairs of springs, consisting each of two crossed poles such as are used in the Scotch hay-cart adaptation, are first lashed together and placed vertically in the wagon, with the lower ends of the two pairs of poles forming the springs pressed into the four corners of the wagon. Another cross, consisting of shorter spars lashed together near their centres, is placed transversely in the centre of the wagon in such a way that the lower ends of the poles press against the angle formed by the sides and floor of the wagon, and their upper limbs engage with the



Modification of extemporized springs to fit inside body of wagon.

under side of the crossing of the pairs of poles forming the springs. They are securely lashed in this position, and ropes are tied from this point and passed over the sides of the wagon, pulled tight, and secured to the wagon frame. The other adjustments are the same as in the hay-cart improvisation. Square lashings are used, except in the case of the transverse cross, where a diagonal lashing is required.

#### A METHOD OF PREPARING A COVERED GOODS RAILWAY VAN FOR THE CARRIAGE OF WOUNDED ON STRETCHERS BY EXTEMPORIZED MEANS.

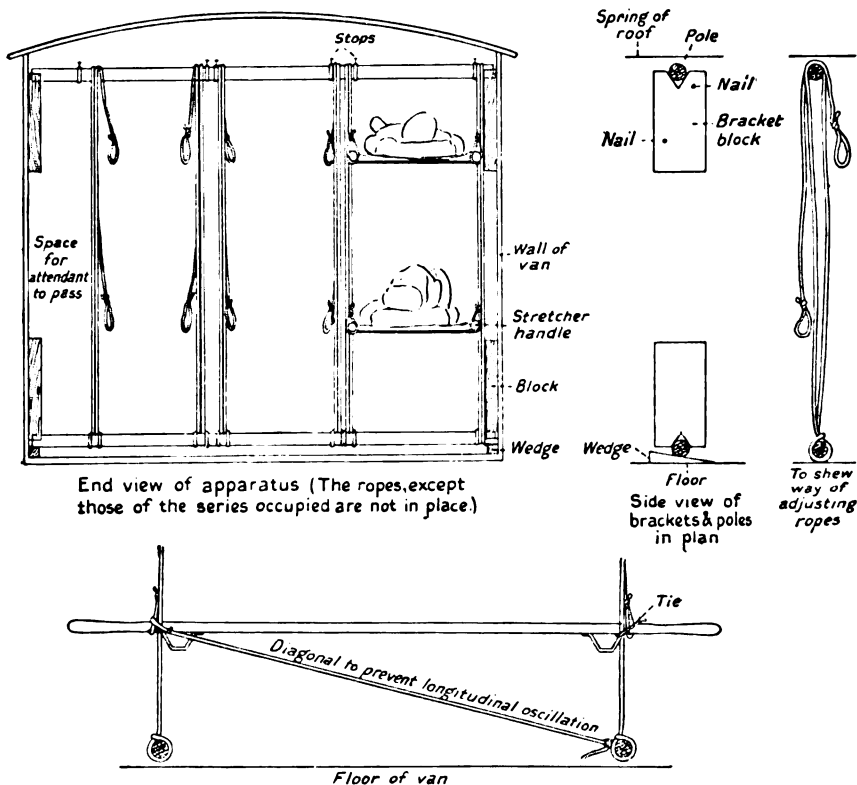
BY LIEUTENANT-COLONEL H. E. R. JAMES, C.B.  
(Retired Pay.)

THE materials required for fitting one set for six stretchers are :— 8 notched blocks of wood 18 in. by 9 in. by  $2\frac{1}{2}$  in. to 3 in.; 4 wedges 9 in. by 2 in. by  $2\frac{1}{2}$  in. tapering to nothing; 4 poles of light scaffolding, diameter  $3\frac{1}{2}$  in. to  $2\frac{3}{4}$  in., of a length to fit inside the vehicle transversely; 12 lengths of  $\frac{1}{2}$ -in. diameter rope of 20 ft. each; 14 pieces of tarred rope yarn 3 ft. in length; 24 pieces of lanyard 2 ft. in length; 6 pieces of small

cord  $\frac{3}{8}$  in. diameter, 12 ft. in length ; 6 pieces of small cord  $\frac{3}{8}$  in. diameter, 6 ft. in length ; 16 6-in. wire nails, 24 2-in. wire nails.

*Tools.*—A rip saw (common hand saw, not tenon saw), a gimlet  $\frac{1}{4}$  in. by 7 in., a claw hammer, a knife.

The principle of the extemporization is suspension by ropes whose ends are looped from transverse poles supported in notches in blocks which are nailed to the walls of the van, the ropes passing over the upper pair of poles and taking their fixture from two lower poles, a double spring being thus obtained.



In a method previously described heavy ropes were used, and ring bolts fixed to the floor of the van through which they were rove. The disadvantages of this plan were that ring bolts could not be easily obtained; the piercing of the ropes for stops to receive the stretcher handles took some time, and people not used to handling ropes found some difficulty in opening the strands. The ropes required were of rather exceptional size.



The plan now to be described involves no difficulty in obtaining the necessary materials, and its only disadvantage is that double the number of blocks and poles are required.

The advantages are: It takes less time to prepare. It is easier to carry out with unskilled hands. It is more springy than the former, for the spring is given by two poles instead of one only.

The details of construction are to be seen in the accompanying sketch.

*The Method of Fitting and Loading, and Steps in its Accomplishment.*—Each set will carry six stretchers arranged in two tiers of three series.

(1) The poles, which should be 8 ft. 6 in. long when procured, must be cut to the length of the transverse diameter of the van. The internal transverse diameter of the van varies from 7 ft. to 8 ft., and sometimes a little over in certain vehicles. The poles should be cut square at the ends, and be  $\frac{1}{2}$  in. shorter than the internal diameter of the van.

(2) The blocks, if not already prepared, must be cut, and notches,  $4\frac{1}{2}$  in. wide at the top, and  $3\frac{1}{2}$  in. deep measured from the top edge of the block, must also be cut—this is done with the saw. Two holes must be bored in each block for nails (see sketch). The blocks are nailed as follows to the walls of the van with the 6-in. nails:—

In the usual 17-ft. by 7-ft. covered goods van with 5-ft. sliding doors, only one set can be used. In this case four blocks are nailed with notches upwards at 6 ft. distance longitudinally, two on each side of the van flanking the door-opening, and opposite to one another in pairs to receive the top poles, 6 ft. apart longitudinally from notch to notch;  $3\frac{1}{2}$  in. should be left for the introduction of the poles between the eaves of van and the top of the block. Four other blocks, one vertically below each of the upper blocks, and with the notches looking downwards, are nailed to the wall, the lower ends being  $3\frac{1}{2}$  in. above the floor.

(3) The four poles are placed with their ends in the notches of the blocks, and the lower two are wedged into the notches with the wedges, so as to keep the poles in position and raise them from the floor.

(4) One piece of the larger rope is now taken, and folded in two, in such a way that one end is 2 ft. 6 in. shorter than the other. The loop formed by the folding is passed under the lower pole, and the two free ends are passed through it and pulled tight. The free ends are then brought over the upper pole in opposite directions and allowed to hang down. Loops of 6 in. in diameter are tied by a common knot so that the one on the longer end is 18 in. above the lower pole, and that on the other 48 in. above the lower pole. The centre of the loops made by the doubling of the rope at the lower pole is marked with chalk or charcoal, or string tied round, and the rope is taken off; the eleven other ropes are measured by it, and loops tied at their ends of exactly the same length. All the ropes are now fixed to the lower poles, six on each, and the ends brought up over the upper poles, the ropes at the far ends of the poles being 6 in. from the wall, and the next ropes 23 in. from them; the two centre ropes are



fixed (in the case of a 7-ft. van) close to the last three, a series of 23-in. spaces being thus formed. The longer ropes are passed in a direction from the centre of the van over the upper pole towards the ends of the van, the shorter from the end towards the centre.

(5) The lengths of tarred rope-yarn are bound round the poles and fixed with the small nails close up to and outside (not including the ropes), so as to stop them from slipping sideways.

The apparatus is now ready to receive the stretchers, which must be loaded as follows: The first into the upper loops of the far side from the door through which they are introduced into the van, the handles of the stretcher being passed into the loops. Next the lower loops of that series. Next the upper of the centre series. Next the lower, and so on. The lanyards are tied round the rackets and the supporting ropes, the handles of the stretchers being between the suspension ropes.

As each series is completed the longer small ropes are tied from the handle at the head end of the stretcher to the further lower pole, diagonally, to check longitudinal oscillation.

When all are loaded the handles of the adjacent stretchers may be tied together with the shorter small rope to consolidate the series.

It will be seen that the spring of the lower pole as well as that of the upper is brought into play—as the upper pole acts as a pulley as well as a spring. This method was tried on a short run, and its only fault was that the spring was rather excessive. But in this trial the vehicle was the last one of the train, and the piece of line traversed had sharp curves, and was rather rough. In normal circumstances I consider that it would be very comfortable.



*g. Roy Army Med. Corps*  
*J. 14, 1922 P<sup>455</sup> - 471*

## Echoes from the Past.

THE STORY OF THE ARMY SURGEON AND THE CARE  
OF THE SICK AND WOUNDED IN THE BRITISH  
ARMY, FROM 1715 TO 1748.

BY MAJOR H. A. L. HOWELL.  
*Royal Army Medical Corps.*

### PART II.

*(Continued from p. 334.)*

IN 1744 the British Army in Flanders was increased to 21,000 men. In May the troops collected in the neighbourhood of Brussels. On April 28 a General Hospital, of which Dr. Pringle was physician, was opened at Brussels, and by December 24 had had 1,259 admissions with 82 deaths, a mortality of 1 to 15. The hospital at Ghent was open throughout the year and admitted 1,698. There were 186 deaths, a mortality of 1 to 9. Dr. Bailey died here in January and was succeeded by Dr. Lawson. Dr. Sandilands was also physician at Ghent. On August 5 a hospital was opened at Tournay. Dr. Wintringham and Dr. Maxwell were the physicians. It was closed on November 8. It had admitted 778, of whom 147 died. Dr. Maxwell then joined the hospital at Brussels in place of Dr. Pringle. In October, owing to the inclemency of the weather, the troops went into winter quarters, the horse at Brussels and the foot and dragoons at Ghent and Bruges. At Bruges and Ghent, with a view to preventing overcrowding in the hospital, the sick were chiefly treated regimentally.

In 1745 the British Army in Flanders was increased to 28,000 men. In the spring the French became active and our troops were concentrated at Brussels. Marshal Saxe with a French Army having invested Tournay, the Allied Army advanced to its relief. The Allies numbered 50,000 men, English, Hanoverians, Dutch, and Austrians, of whom 20 battalions and 26 squadrons were English.

The "General Orders" of the Duke of Cumberland, the Commander-in-Chief of the British Army, are full of interest. On April 23, the troops at Ghent received orders for the march to Alost next day. Some extracts are worthy of note. "There will be one wagon to each Batt". to carry weak men, but not any baggage." "The Quartermasters and Camp Collourmen to goe

away this morning to Allost to mark out the ground for 10 Batt<sup>s</sup>. to Encamp and the Artillery, to demand wood and straw for the men's Tents, and fire, to demand also the same number of Wagons as mentioned in the order. The Dragoon Qmrs. are to demand Billets for Cantooning 12 Squadrons in Allost & the Adjacent Villages, & also to take quarters for the Staff and to inform themselves how the Troops are to get Forage, & if possible to have it sent to the Villages." The camp colourmen were a sergeant and a man from each company. Their duties were to accompany the quartermaster a day's march ahead of the troops to lay out the camping grounds and build latrines before the troops arrived. They kept the camps clean and drew the rations, clothing, ammunition, working tools, &c. Each of them when on the march carried either a spade or a hatchet. To return to the orders. "Sick men & who are not able to March to be sent to the Bylock Hospital as soon as possible. Mr. Napier the Director (of the hospital) to be acquainted immediately, that he may have Nurses there, & fire for them, no small poxmen to be sent thither but to Saint Antony's Hospital. A Corp<sup>l</sup>. and 6 men of Riches (now 4th Hussars) as a Guard upon the Bylock, the same guard of the same Reg<sup>t</sup>. at St. Antony's Hospital this day." (Bylock = bylocque, Flemish for an enclosure. The Bylock is, I believe, still the principal hospital at Ghent.) The General Orders clearly attest the strict discipline enforced upon the soldiers, no less than the care evinced for all the necessities of the army and its followers, and the consideration shown to the persons and property of the surrounding population. Pillaging was punished by death. Cutting down of trees was also severely dealt with.

The route was by Anderlecht, Hall, Soignies, Cambron, Chateau de Maulbay, and Leuse to Brissoel where the French came in sight on May 9.

A General Order, dated Anderlecht, April 29, runs: "The Surgeons of ye several Regiments are to carry their Medicine Chests and Instruments upon their Batt Horses, which are to March at the head of each Corps w<sup>h</sup> their men's Tents. His R.H. allows 1 Wagon for ye sick of each Reg<sup>t</sup> in Camp, which Wagon goes in the rear of ye Reg<sup>t</sup>." Straw was issued for tents at the rate of 4,800 lb. per regiment and 1,800 lb. per squadron, half the amount being supplied every eight days when in camp.

At the Camp of Soignies, May 3, a General Order ran as follows: "The sick not fit to be carried forward to be sent to the Hospital at Brussels by the Wagons y<sup>t</sup> return for bread. A Sergt.



of a Brigade to be sent w<sup>h</sup> them, and proper Certificates to be signed by an officer and Surgeon, to be sent w<sup>h</sup> them." Again, at Cambron, three days later: "The bread Wagons for to carry ye sick must be sent to each Reg<sup>t</sup>. the night before ye Army marches, & dismissed next day."

On May 4, 1745, Drs. Pringle and Wintringham opened a General Hospital at Ath.

On May 10 the allied army lay in sight of the French who were ready for battle. The French position was a very strong one. Barré Wood on their left, Fontenoy in the centre, and Antioing on their right, were carefully fortified and entrenched and defended by 260 guns. In their front lay a valley and on their right a river.

At 2 a.m. on April 11 the Battle of Fontenoy began. The Dutch were repulsed in their attack on the left, Ingoldsby failed to take the wood of Barré, but 10,000 British and Hanoverian infantry advanced in solid column with a front of forty men into the interval between Fontenoy and the wood of Barré, and, notwithstanding a terrible flanking fire and repeated cavalry charges by the French, won the crown of the position. But the Dutch did not stir and the French were able to bring up their Irish Brigade. The British retired in good order. The battle was over by 2 p.m. The twenty British battalions had lost over 4,000 men. The 12th and 23rd Regiments each lost over 300 men, the 21st and 31st Regiments nearly 300 each, and the three battalions of Guards about 250 each. Our cavalry lost 300 men. The 12th, 21st, and 23rd were so weakened that they were sent into garrison and relieved by three fresh regiments. Cumberland's headquarters had been at the village of Maubray, one and a half miles from Fontenoy, and here many of the wounded were collected; most were, however, left on the field.

The Allies after the battle retired to Ath, and later to Lessines. "The French treated the wounded English with great inhumanity, and killed several of them who asked for quarter; nor were the English prisoners treated with any degree of generosity. Marshal Saxe, immediately after the battle, sent to the Allies to desire they would carry off their wounded; accordingly the Duke of Cumberland sent a hundred and five waggons to bring them away; but both waggons and men were detained, contrary to the laws of nations and of arms, with regard to the carriages at least." There is in the *Gentleman's Magazine*, vol. xv, 1745, part of a letter from a surgeon in the British Army, who was made a prisoner by the French after Fontenoy. It is as follows:—

"We, surgeons, sent to take care of the wounded when carried from the field of battle, were made prisoners of war, and treated in a very merciless way, for not only we, but about 1,000 more, were stript of everything valuable we had, viz., watches, swords, money, and cloaths, and not only so, but our very instruments were taken from us, altho' the barbarians saw hundreds continually imploring our assistance. In this unprecedented way we remain'd three days, numbers dying every hour, because we had nothing to dress them with, when they were flung in waggons and drove along the causey to Lisle, Valenciennes, &c. In this jolting journey you may easily conceive the misery of these poor wretches, most with their legs, arms, &c., shatter'd to pieces.

"I assure you, the impression is so strong on my mind, that no time will efface the remembrance; I saw their wounds and heard their groans. At last we surgeons were allow'd to pass to our regiments, and when we arrived at the camp we waited on his royal highness, laid before him the matter of our treatment, and presented him with a bag of chew'd balls, points of swords, pieces of flint, glass, iron, &c., we had extracted from the wounds." The Duke was very indignant, and a trumpet was sent from the allied army to the French monarch, with a coffer filled with pieces of thick glass, brass and iron buttons, all bloody, that were taken out of the wounds of Lieutenant-General Campbell and other officers; accompanied with a letter from His Royal Highness, importing that "the most cruel and barbarous nations never made use of such pernicious weapons, in carrying out the most violent war." It is related that the French king turned pale when he received these "dismal relics," and was induced to treat the English wounded and prisoners in a more humane manner.

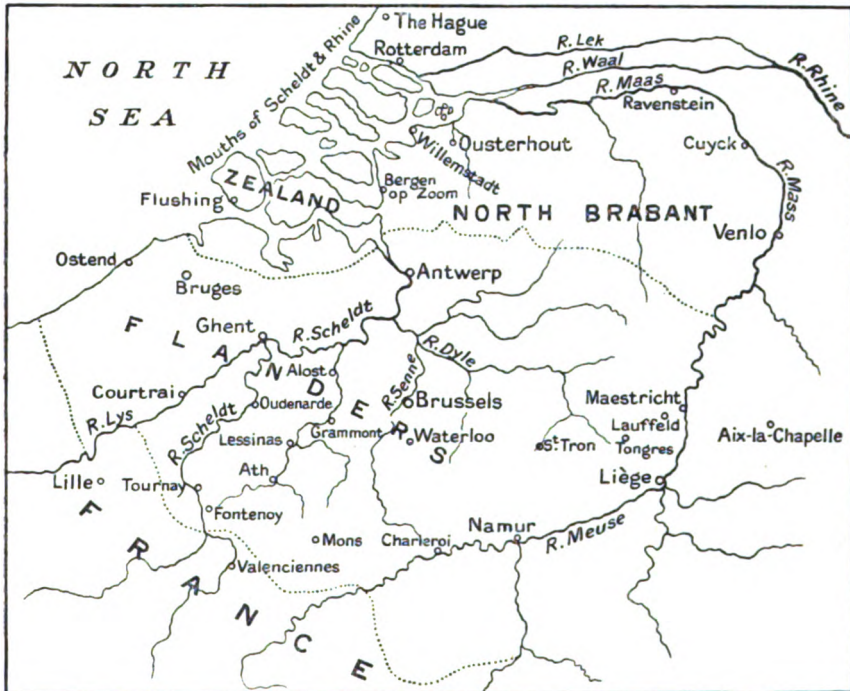
The General Hospital at Ath remained open till August 25, 1745. It had admitted 991 sick and wounded, of whom 59 died.

At the time of the battle of Fontenoy and for a time afterwards, Oudenarde, being connected by means of the Scheldt with Ghent and Antwerp, and by road with Ath and Lessines, was the principal depot for the British Army. A "General Order" dated June 2 is of interest; it runs: "Whenever the situation of the army shall be such, that the bringing in of the recovered men from the Hospital at Ghent, by the way of Oudenarde, may not be thought safe, new directions will be given, in what manner they shall come up to the army." Two chaplains were left with the sick at Ath, and, on June 5, the chaplain-general was directed "to keep a roster of the black cloath, and to order one forthwith to attend ye Hospital at Brussels."



While at Lessines Mr. John Crosley, surgeon's mate of Johnson's (33rd Regiment) was tried by court martial for spreading a report to the disadvantage of Lieutenants Collis and Sampson of the same regiment. "General Order" of May 26, says: "John Crosley, Surgeon's Mate to Brig<sup>r</sup> Johnson's Reg<sup>t</sup>. to be cashiered and drum<sup>d</sup> out of both Lines of the British Army, w<sup>h</sup> a Halter about his neck, & not to return again, either in Camp or Garrison, on pain of severe punishment, for having unjustly and ignominiously aspersed the character of Lieut. Sampson & Lieut. Collis." Both lieutenants had been wounded at Fontenoy.

MAP TO ILLUSTRATE THE CAMPAIGNS OF 1742-48.



Tournay fell to the French soon after Fontenoy, and its fall was followed by that of Ghent, Bruges, Oudenarde, Dendermonde, Ostend, and Nieupoort. The fall of Ghent (where the Royal Scots and Welsh Fusiliers were captured) and Ostend, in August, was a great blow to the British, for large depots of stores for the use of the army were maintained at these places. Cumberland fell back to



Brussels, with headquarters at Vilvorde, and the base was transferred to Antwerp. The general hospital at Ghent was finally closed by its capture by the French on August 10. Since December 25, 1744, it had admitted sick to the number of 1,134, of whom 74 died. On July 16, 1745, a General Hospital was opened at the new base, Antwerp, Drs. Sandilands and Lawson becoming the physicians. Drs. Wintringham and Maxwell were at the hospital at Brussels, which was closed on November 24, 1745, having treated 500 patients, with 43 deaths, since September 14.

The Jacobite Rebellion of 1745 found England almost defenceless, and, in September and October the greater part of the British Army in Flanders was brought back to England. In 1746, Brussels, Mechlin, Louvain, Antwerp, Mons, Charleroi, and Namur were taken by the French. Our base General Hospital at Antwerp was maintained until June 7. Dr. Lawson remained as physician. Since its opening in July, 1745, 1,943 patients, of whom 209 died, had entered its doors.

At the end of the year, the British troops having suppressed the rebellion in Scotland, began to return to Holland. The war was now in Holland, which the French had invaded. A General Hospital was opened on June 14, 1746, at Oosterhout, in North Brabant, a few miles south of the mouth of the Rhine. The campaign was of little interest, and the army was fairly healthy. In the early years of the war the tendency had been to evacuate the sick as quickly as possible to the general hospitals. This led to great overcrowding and rapid spread of epidemic disease. The beds were large, two patients occupied one bed, so that it is easy to realize how rapidly septic and contagious diseases must have spread. I suspect also that in the early stages of the war the Director of the Hospitals was not a medical man, for the improved health in the last two years of the war is attributed by Fonblanque and other writers to the fact that "all were under the surgeons." We find that now regiments were encouraged to open regimental hospitals and to keep their own sick as long as possible. This method was found to give better results. At the same time there was a great improvement in the general hospitals. At Oosterhout, where Wintringham was physician between June 14 and December 24, 1746, 804 patients were admitted, and there were 25 deaths. Next year the scene of war shifted further east and south. The allied army was stronger, as the Dutch had risen in defence of their country, and the Duke of Cumberland was in command. In August, 1746, we had only three regiments of dragoons and seven of foot in the Netherlands; in

1747 the British troops increased to five regiments of horse and fourteen regiments of foot. At home and abroad the army now numbered 85,611 men. In an action near Liège on October 11, 1746, it is noted in the *Gazette* that five hospital wagons were taken by the enemy. On July 26, 1746, a General Hospital was established in Maestricht; Pringle was physician there. This hospital took in 1,165 patients before it closed temporarily on February 28, 1747. There were 119 deaths during that period. The hospital at Oosterhout was still maintained. It remained open till the end of the war. During this period, December 27, 1747, to January 7, 1749, there were admitted 7,547 patients; of these 727 died. Wintringham was replaced by Dr. Lawson, who died in 1747, and was succeeded by Dr. Clephane. In 1748 another physician joined at Oosterhout—Dr. Barker. Wintringham had gone to Maestricht where the General Hospital was re-opened on June 27, 1747. The sick and wounded appear to have been evacuated from Maestricht down the river Meuse, but in June, 1747, it was found necessary to establish another General Hospital at Venlo, about half-way down the river Meuse from Maestricht. It was in charge of Mr. Lloyd, apothecary, and Mr. Burlton, surgeon, until February 6, 1748, after which date Pringle and Wintringham did duty there. Up to February 6, 1748, 2,061 persons received treatment at Venlo, and there were 318 deaths. In July, 1747, a great battle was fought at Lauffeld, near Maestricht, where the Allies lost 6,000 and the French 10,000 men. The British loss was 2,000; the Scots Greys alone lost 160 men. Nineteen British regiments were present. After this the war languished. Near the end of November the Maestricht hospital was closed, after having admitted 3,064 sick and wounded in five months. There were 326 deaths. Venlo was still open, and General Hospitals, in 1748, were opened at Ravenstein and Cuyck. Both places are on the Maas, Cuyck about twenty-eight miles below Venlo, and Ravenstein about fifteen miles below Cuyck. These three hospitals closed in July, 1748, sending 462 of their sick remaining to Oosterhout. They had admitted 1,042 and had 44 deaths. In 1748 the regimental hospital system was not altogether a success. When the camp was at Nistelroy the sick were crowded into the few cottages available and an epidemic of typhus broke out. This led Pringle to recommend that when the army was in a fixed camp the regimental hospitals should be well separated; and again, if a sudden influx of sick occurred in a general hospital overcrowding should be avoided by dispersing the sick in several villages rather than keeping them in

one. He adds, "The danger from foul air can never be compensated for by diet and medicine." At Ravenstein the wards were spacious and well-aired, and although many cases of typhus were admitted the disease did not spread. We read that during 1748 the hospitals were a model of medical administration. "*Separate* and clean beds, with frequent changes of linen, were provided for the use of the patients. Trained female nurses were employed and hospital storekeepers and clerks furnished every necessity promptly and with regularity." The hospitals were directed by Mr. Middleton, a surgeon, who afterwards became Surgeon-General.

The war was ended in October, 1748, by the Treaty of Aix-la-Chapelle. The troops in November moved to Willemstadt and there embarked for England. The winds were contrary, and some of the ships lay at anchor about a month. Typhus broke out on board, and this was particularly bad upon the hospital ships on which had been embarked the sick from Oosterhout. The sick were conveyed to Ipswich, where a large hospital was opened on December 31. It did not close till March 11, 1749. The admissions numbered 626, of whom 52 died. When it closed 67 patients were sent to London hospitals or left at Ipswich. Dr. Barker died at Ipswich. Of the eight physicians employed in the hospitals during the war three died. During the whole war 32,246 sick and wounded had been received in the hospitals, and 2,563 of them had died. This does not include those who had died in cantonments, on the line of march, or in the transporting of the sick from one place to another.

We have already noted the disastrous events which followed the recall of our troops from Flanders, after the Fontenoy campaign, to meet the rebellion of 1745 in Scotland. Let us now turn back and record the medical history of that rebellion.

The chronicles of the '45 are numerous, but from a medical historian's point of view are of little value. The only connected account of the medical side of the campaign is that given by Sir John Pringle in his great book on "*The Diseases of Soldiers.*" This account has been freely drawn upon in the following pages, and amplified where possible from other sources, such as the standard histories of the rebellion, Fortescue, Andrew Lang, "*The Cumberland Memoirs,*" and the contemporary journals. A valuable paper on "*The Medical Heroes of the '45,*" by Dr. W. A. Macnaughton, which appeared in the *Caledonian Medical Journal*, in 1897, has also been of great service.

In July, 1745, Prince Charles Edward, the Young Pretender,



embarked at Nantes in a little privateer, "La Doutelle." He was accompanied by a French man-of-war, in which his money and military stores were placed. On the way to Britain an English vessel encountered them and fought the French man-of-war so vigorously that she had to put back to France to refit. The Prince continued his voyage, and with seven companions landed in the Hebrides. On July 25 he reached the mainland at Borrodaile and met with but a cold reception until Lochiel joined him. On August 19 he raised his standard at Glen Finnan. Three days before this his Highlanders had ambushed and captured two companies of the Royal Scots on their way to reinforce Fort Augustus. Inverness was loyal, and Fort Augustus and Fort William were garrisoned by some companies of the 6th Foot and the Royal Scots. Stirling and Edinburgh Castle were also garrisoned by English troops. The English troops in Scotland, numbering about 3,000, were commanded by Sir John Cope. He had no artillery. Mr. Hugh Hunter was Surgeon-General to the Forces in North Britain (August, 1745). Cope promptly determined to march into the Highlands and crush the rebellion, if possible, in the mountains. Leaving his cavalry behind he marched from Stirling with 1,500 men (44th, 46th, and 47th Foot), at first to relieve Fort Augustus, but, at Dalwhinnie, avoided the rebels, who were strongly posted at Corrie Arrack, by turning aside to Inverness. This left the road to Edinburgh open. Charles at once moved south to Perth, crossed the Forth above Stirling, and reached Edinburgh on September 17. At Colt Brig two regiments of Dragoons ran away from the Highlanders. Cope on September 12 set sail from Aberdeen and landed with his troops at Dunbar a few days later. Edinburgh Castle was held by two companies of the 47th Foot. Cope was marching on Edinburgh when the rebels moved out and got between him and England. Sir John turned round to meet them and drew up his men in good position at Preston Pans. He had about 1,400 foot (the 46th, Loudon's Highlanders, and some companies of the 6th, 44th, and 47th), six guns and some mortars manned by sailors, and the 13th and 14th Light Dragoons. The Young Pretender had about 2,500 men with him.

On September 21 the rebels attacked. Cope's cavalry and artillery bolted, and in six minutes the battle was decided, not more than 175 of the English infantry escaping death or capture. The rebel loss was only 34 killed and 76 wounded (Cust). The English had 8 officers and 300 men killed, 83 officers and from 400 to 500 men wounded and taken (Murray). Other accounts say 1,200

killed and wounded, and 1,800 taken prisoner including wounded. Prince Charles gave orders for the immediate relief of the wounded without distinction of friend or foe. Lang notes that when the Prince marched out of Edinburgh "he provided amateur ambulances, coaches, and chaises." They came in very usefully after the battle. Colonel Gardiner's house, which adjoined the battlefield, was converted into a temporary hospital. The surgeons of the English Dragoons had not run away with their regiments, but surrendered in order to take care of the wounded. They were Surgeon Cunningham, of Gardiner's, and Dr. William Trotter, of Hamilton's Dragoons. These two surgeons collected wounded and operated in the house of Collector Cheape at Preston Pans. They trepanned a Captain Blake, who lived until 1800. Trotter afterwards became a prominent surgeon in Dublin. Dr. Young, surgeon of Colonel Lee's regiment, was also taken prisoner by the rebels.

As soon as the news of the battle reached Edinburgh many surgeons hastened to the battlefield to help the wounded. Amongst these were George Lauder, the President of the Edinburgh College of Surgeons, and his apprentice, George Hay. They attended the wounded in Colonel Gardiner's house and both afterwards joined the rebels. Lauder was captured after Culloden, was imprisoned for some months, and later returned to Edinburgh, where he died in 1762. Hay fell sick with ague and left the Prince. He surrendered and was set free in 1747. He afterwards went to Rome and became a Doctor of Divinity and Bishop in the Roman Catholic Church. Another Edinburgh surgeon, a staunch Hanoverian, who also attended the wounded at Preston Pans, was Alexander Monro, *Primus*, Professor of Anatomy at Edinburgh and one of the founders of Edinburgh Infirmary. He was the son of one of King William's army surgeons and father of Donald Monro, a celebrated army physician during the Seven Years' War. In addition, the rebel army was provided with surgeons of its own and some of these, later, when tried as rebels, owed their lives to the fact that they attended the English wounded at Preston Pans. Monro was very active in collecting the wounded and had several hundreds of them carried to Edinburgh and placed in the Edinburgh Infirmary, then only six years old. Amongst the wounded was a coloured medical student from Jamaica, named Myrie, who, just before the battle, came out of Edinburgh and joined Cope as a volunteer. He fought well in the battle, but was terribly wounded by the Highlanders.

Practically the whole of Scotland was soon in Jacobite hands,

but Charles returned to Edinburgh and did not move until November. Marshal Wade was at Newcastle. He had with him in September the 2nd and 3rd Dragoon Guards, the 8th Dragoons, and the 13th, 27th, and 34th Foot. Regiments were recalled from Flanders and the Dutch furnished a contingent. Three battalions of foot guards and seven others landed in the south of England in October, and in November the whole of the remaining British infantry in Flanders, with part of the cavalry, marched to Willemstadt and embarked for England. Pringle, the Physician-General in Flanders, came over with them. The troops were kept long on board ship, being delayed by contrary winds. Jail fever broke out amongst them and there were cases of remittent fever. These troops landed at Newcastle, Holy Island, and Berwick.

At Newcastle a hospital was opened to receive the sick of Wade's force and the sick that landed there. The fever became so infectious in this hospital, owing to overcrowding, that the nurses and most of the medical attendants were seized with it. Three of the apothecaries of that place, with four of their apprentices and two journeymen employed in the hospital, died of the fever.

Two regiments which disembarked at Holy Island landed ninety-seven cases of typhus fever, of whom forty died. The infection spread to the population of the island and fifty of them (one-fifth of the inhabitants) died.

In November, Prince Charles with over 4,500 men determined to invade England. Avoiding Wade, who now had an army of 10,000 men, the rebels marched along behind the Cheviots to Carlisle, which they took, and then turned south through Lancaster and Preston to Manchester, where they gained some recruits. The Jacobite army now numbered nearly 6,000 men. Skilfully deceiving the Duke of Cumberland, who with a large force lay at Lichfield, the rebels got past his army and had nothing between them and London but the hastily-formed camp of the Guards at Finchley. Prince Charles's officers were, however, disheartened at the neutrality of the English, and, fearing to be cut off from Scotland by Wade and surrounded by Cumberland's force, when the rebels reached Derby they decided to return to Scotland. The retreat was very rapid. Cumberland's cavalry was in pursuit but was checked in a skirmish at Penrith, and the Prince's army passing through Carlisle, where he left a garrison, reached Glasgow. Here by large requisitions it refreshed itself after its rapid march. The rebels had marched 580 miles in fifty-six days.

Let us now turn back to Cumberland's army. In the beginning



of December twelve battalions of infantry and three regiments of cavalry assembled at Lichfield under the Duke's command. The troops were fairly healthy. The Quakers had made a present of flannel under-waistcoats to the men, which were greatly appreciated. At the end of the month the troops went into quarters, but the cavalry and a thousand foot followed the rebels to Carlisle. The sick of this detachment were left in charge of local surgeons in the towns on the road and were well treated. At Lichfield, the work-house was fitted up for a hospital and many sick were admitted, with the usual result, an outbreak of jail fever. Other diseases were "the autumnal remittent fever," coughs, pleurisies, and rheumatism, with a few fluxes.

Carlisle was invested in January, 1747, and soon fell. The besiegers had had 600 to 700 ill, of whom not more than forty died. The surgeon to the rebel garrison, Dr. James Stratton, of Berwickshire, was taken prisoner to London and there tried and acquitted. Other rebel surgeons taken at Carlisle were: James Murray, of Edinburgh; William Gray, of Brechin; and Dr. Abernethy, of Banff, a captain in the Duke of Perth's regiment. These were tried at Carlisle in August. Murray was acquitted on account of attending the King's wounded at Preston Pans; Gray was condemned to death, but recommended to mercy and not executed, and Abernethy was condemned to death, but died before the date for his execution.

After a week's rest in Glasgow the rebel army advanced to besiege Stirling. During the Prince's absence in England, Lord Strathallan had collected 3,000 men, and these, with some French soldiers, joined the Prince's army, bringing it up to 9,000 men, the most he ever commanded. Marshal Wade had been superseded by General Hawley, who with 9,000 men set out to relieve Stirling. Charles attacked and defeated Hawley's troops at Falkirk on January 17, 1746. Hawley's left and centre were badly beaten, but his right retired in good order. Some of his medical equipment fell into the hands of the rebels. A chest of instruments and two of drugs were taken and were given to Dr. George Colvill, the fourth son of Lord Culross, a Dundee physician who had joined the Prince after Preston Pans. Some prisoners were taken by the English at Falkirk. Amongst these were three Edinburgh medical students, Robert Douglas, Thomas Barron, and William Macghie, who had joined the rebels. They were imprisoned in Doune Castle but escaped. Douglas was afterwards a surgeon in the Navy, and Macghie, M.D. Edin., 1746, settled in London and became physician to Guy's Hospital. He died in 1756. Amongst those wounded at



Falkirk was Dr. Archibald Cameron, the youngest brother of Lochiel; amongst the killed on the other side was Dr. Duncan Munro, of Obsdale. Dr. Munro had spent much of his life in the East Indies. He joined his brother, Sir Robert Munro, of Foulis, who was serving with Hawley, as volunteer aid to the wounded, and was killed by the Highlanders in his 59th year.

After Falkirk, Charles returned to the siege of Stirling, in which he failed, and then marched his army to Inverness. His army was suffering from lack of provisions. In March the rebels took Fort Augustus. Cumberland now took over command of the English troops in Scotland and soon restored confidence. The English, having command of the sea, provisioned their troops with ease and prevented any aid to Charles from the French. In December, 1745, H.M.S. "Milford" captured a French ship off Montrose. Amongst those on board were "John Divier and Thomas Hogan, surgeons, and four servants," who were on their way to join the rebels. Another French ship, the "Bourbon," was taken in 1746. It had as passenger M. Botel, "major-surgeon," on his way to join the Prince.

On February 10, 1746, the English army marched from Edinburgh to Perth. It consisted of fourteen battalions. They were mostly in billets, but two battalions were quartered in churches. Pulmonary complaints were very common. In March the troops marched to Montrose and Aberdeen. They left 300 sick at Perth who were accommodated in the corporation halls and in private houses. Till the end of March the army lay at Aberdeen, but afterwards nine battalions were cantoned at Inverurie and Strathbogie, and one more battalion landed at Aberdeen. The health of the men suffered from the climatic conditions, and inflammatory diseases continued. The officers, being in good quarters, kept healthy, although Pringle notes that in the beginning of March, "when the weather was very cold, a few were seized with gout." The sick were well lodged in the town hospital at Aberdeen, and when the army moved, about 400 sick were left behind at Aberdeen, Inverurie, and Strathbogie. On April 13 the army encamped at Cullen, and next day crossed the Spey and entered the town of Nairn.

On April 14, 1746, Prince Charles stayed the night at Culloden House. Want of food and the habit of the Highlanders of returning to their homes had reduced his army to 5,000, and many of these were absent in Inverness and elsewhere searching for food. It was decided to make a night attack on Cumberland's army, but



the darkness of the night and the men's fatigue prevented this, so they fell back and took position at Culloden Moor. On April 16 the English advanced to attack the rebels. Cumberland had about 6,500 officers and men. The regiments present were the Royal Scots, 3rd, 4th, 8th, 13th, 14th, 21st, 25th, 27th, 34th, 36th, 37th, and 52nd Foot, and the 12th and 15th Dragoons. He was also strong in artillery. The rebels were completely defeated with a loss of 1,000 killed and 500 prisoners, of whom 200 were French. The English losses amounted to 300 killed and wounded. Two-thirds of these belonged to the 4th and 27th Regiments. Cumberland stained his name for ever by his brutality to the rebels after the battle. No quarter was given in the pursuit, and many of the wounded were put to death. Later, Cumberland fixed his headquarters at Fort Augustus, and harried the Highlanders with every species of military execution. The rebellion was over. After five months of wandering and privation in the Highlands and the Hebrides, the Young Pretender got away to France.

The day after Culloden the English army marched to Inverness and encamped on the south side of the town. About 70 sick had been left on the way. Pleurisy and pneumonia of severe type were common. At Inverness the wounded, in all 270, were accommodated in two malt barns. Several had received wounds from broadswords: these easily healed, "as the openings were larger in proportion to the depth." In addition two well-aired houses were taken over for the sick. Regimental surgeons were ordered to find quarters for their own sick and to send only their severe cases to the General Hospital. Great care was taken to keep the hospitals and jails clean in order to prevent infection: the prisoners were placed on board ship. Pringle's hand can be seen in all these precautions. At the end of May, however, four regiments landed at Nairn and joined the army. A few days after twelve men of one of these regiments (Houghton's) were sent to hospital and found to be suffering from typhus fever. This regiment had become infected in this way. A French ship had been taken, on board of which were some troops going to assist the rebels. Thirty-six of these were deserters from our army in Flanders. They were cast into prison, and, later, released and drafted into Houghton's regiment. They brought the jail fever with them. This regiment had eight officers sick with the disease at Nairn, and left 80 sick there. At Inverness it sent 120 cases of typhus to hospital. The disease, thus introduced, soon spread in the hospitals and among the inhabitants of the town.



On June 3 four regiments were left at Inverness and nine, with a regiment of horse, marched to Fort Augustus, leaving in hospital about 600 sick besides the wounded. At Fort Augustus, there being no straw, the troops were ordered to cut heather for bedding. It was noted that those who changed their bedding most often were the least sickly. Dysentery now became common. The only accommodation for the sick was a few huts in the neighbourhood; many of the sick were therefore sent to Inverness. The hut hospitals soon became overcrowded and an outbreak of typhus fever followed. In the middle of August the camp broke up. Between 300 and 400 sick were left at Fort Augustus who were afterwards carried to Inverness. Ultimately, many of the sick and wounded from Scotland and Newcastle found their way to the London hospitals and some to Bath.

From the middle of February, when the army crossed the Forth, to the end of the campaign, there had been in the hospitals upwards of 2,000 men, including the wounded; of which number nearly 300 died and principally from typhus fever.

In November, 1745, the Lord Mayor of London raised by subscription £18,435. This was distributed: to the maimed and wounded soldiers £5,000, to brave soldiers £5,000, to the sick in hospital at Newcastle £300, and the remainder in providing a blanket and two paillasses for each tent, thirty watchcoats to each battalion, and a pair of worsted gloves to each man. This Guildhall fund "in aid of soldiers in suppressing the late rebellion" was not closed until January 28, 1748, when St. Bartholomew's, St. Thomas's, and the Bath Hospitals were given £1,000 each, and each of the infirmaries of London, Westminster, and Hyde Park Corner was given £100, "for the assistance which they had afforded the sick and maimed soldiers" ("Cumberland Memoirs" and *Gentleman's Magazine*).

It remains only to record the names of the rebel medical officers and of a few of those who took part on the other side. Two rebel surgeons were taken at Culloden, George Lauder and Dr. John Macdonald, of Kinlochmoidart. Both were imprisoned for a time and afterwards set free. John Rattray, F.R.C.S.Ed., was in Inverness asleep when the battle was fought and surrendered next day. He died in 1771. Lochiel's brother, Dr. Archibald Cameron, was wounded, but escaped to France and became a Captain in the French Army. Returning to Scotland in 1753, he was captured, taken to London, and imprisoned in the Tower. He was sentenced to be hanged, drawn and quartered, and was executed at Tyburn on



June 7, 1753, the last Jacobite executed for his share in the rebellion. Other surgeons who took part in the rebellion and escaped were: William Balfour, Surgeon to the Macgregors, who marched into England with them; Dr. James Carnegy, Surgeon to Ogilvy's regiment; Ludovick Caw, Surgeon to Perth's regiment; John Congleton; James Crichton, who was at Culloden as Surgeon to Ogilvy's regiment; Alexander Crook, senior, Surgeon-Major of the Atholl Brigade, and his son, who was his mate; Dr. John Cruikshank; Dr. Erskine Douglas; Charles Fife; Robert Halkerston, who served in Lord Strathallan's Horse through the rebellion and was at Culloden; Andrew Hay; George M'Gill; John Mackenzie; Lachlan M'Laren; Patrick Middleton, who bore arms in the rebel Life Guards; John Murray, who served in Perth's Squadron and was at Culloden; William Rait, surgeon to the rebel Life Guards, who escaped to France after Culloden and died at Dundee in 1760; James and Thomas Volume; David Wemyss of Cupar Fife, who had also been "out in 1715"; John Wright; Hercules Paterson; Francis Ross; and Sir Stuart Threipland, M.D., of Fingask, who had been President of the Edinburgh College of Physicians in 1744. He went to Derby with the Prince and was at Culloden, where he attended the wounded Lochiel and took to the hills with him. He escaped to Rouen but was amnestied in 1747, and became President of the College of Physicians, Edinburgh, from 1766 to 1770. He died in 1805, aged 59. Hugh Mercer served as surgeon's mate in the rebel army. He went to America after Culloden, and became a General in the American Army. He was killed fighting against us at Princeton in 1777.

In the English Army John Pringle was the most prominent medical officer. His biography has already appeared in this Journal. We need note but two others. James Grainger (1721-1766), M.D., was Surgeon to the 13th Foot throughout the rebellion, and also during the campaigns in Holland in 1746, 1747, and 1748. He settled in London and became well known as a poet, critic, and historian. He wrote an "Ode to Solitude," which was greatly praised by his friend, Dr. Johnson, a translation of Tibullus, and on the intermittent fever in Holland, on syphilis, and on West Indian diseases. He went out to St. Christopher in the West Indies, married the daughter of the Governor, and, setting up as a planter, amassed a large fortune. He wrote a fine poem on "The Sugar Cane," which appeared in 1764. He returned to England, but went back to the West Indies and died there. The other surgeon was Thomas Dimsdale, M.D., Aberdeen, son of an Essex surgeon, who



served with the army until Carlisle was taken. He then retired to practise at Hertford. He became L.R.C.P. in 1761, F.R.S. in 1769, and, in 1767, published a book on inoculation for smallpox which ran through seven editions. He was called to Russia to inoculate the Empress Catherine and her son, and became a Baron of the Russian Empire. He was paid a fee of £12,000 and a pension of £500 a year. He returned to Hertford and published two other works on inoculation for smallpox. He was M.P. for Hertford, 1780-1790. With his son and the Barnards he opened a banking house in Cornhill, which still exists. He died in 1800, aged 89.

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### Reviews.

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WAR AND WOMEN. London: G. Bell and Co. 1913. Pp. xvi and 239. Price 3s. 6d. net.

Mrs. St. Clair Stobart's narrative of the work of the Women's Convoy Corps during the first Balkan War is described on the cover as "The Record of a Piece of Practical Service rendered by Women in War Time, which is used as an Argument for the Regular Employment of Women, adequately trained, as an Integral Part of the Territorial Army." As a record of practical service it cannot fail to excite the liveliest admiration and interest, but as an argument for the inclusion of women in the Territorial Force, in the sense in which the writer evidently intends, it scarcely convinces, and is rendered none the more convincing by the somewhat remarkable views expressed in a prefatory note over Viscount Esher's signature.

As one who had the privilege of serving with the Bulgarian Army in Thrace at the same time and in the same place as Mrs. Stobart, the reviewer can bear testimony to the accuracy of the description of scenes and facts contained in the book, and to the splendid success which crowned Mrs. Stobart's determination to show that women, "trained and disciplined," as she says, could manage a hospital in war time. The narrative is delightfully told, with many shrewd observations on men and manners as seen in the Balkans, and occasional digs at "mere man," who cannot, one learns, even make bread, and who conducts war with unnecessary brutality, always trying to scatter his fellow-man's brains.

Why then should women take part in war? Because they require an outlet for their energies, and to minimize the brutality of man aforesaid, with the hope of eventually abolishing war altogether. They should be included, we are told, in the Territorial Force, because there is "little, if any, of the work which is at present being performed by men of the R.A.M.C., which could not be done by women," and the system of voluntary aid detachments is not enough. "Volunteer women are wanted to render first aid in every department of work which occurs between the removal of the wounded from the field hospital to their



arrival at the base hospital." They must be given "opportunities of training and discipline similar to those which are given to Territorial R.A.M.C. men," and be allowed to form a "Supplementary Army Medical Corps of Women," with pay, titles, and ranks. All this, apparently, ignores the Territorial Force Nursing Service, with its special duties, ranks, and rates of pay, although there is a brief reference to it at the beginning of the book. What is aimed at, one gathers, is the inclusion in the Territorial Force of medical units composed solely of women, officered by women, and managed by women, and comprising women surgeons, trained nurses, cooks, and "general duty orderlies."

Whether Mrs. Stobart can succeed in her main object or not, she can always point to the fact of having done what she claims women can do; and if the time should ever arise when similar services could again be rendered, it is doubtful if all the Powers of Europe, still less the British Red Cross Society, or even "the hierarchy of the R.A.M.C.," as Lord Esher calls it, could prevent her from getting her own way! That other women will be equally successful as "directrices" of units in the field, even after training similar to the Territorial R.A.M.C., is a matter in which those on whose shoulders responsibility lies may well feel inclined to doubt.

But what benefit can Mrs. Stobart's cause derive from Lord Esher's prefatory note? The statements and opinions contained in it are so peculiar that the reader—at any rate the reader professionally interested in the subject—is apt to feel prejudiced before he reads Mrs. Stobart's arguments. Setting aside the opinion that medical assistance to foreign armies engaged in war is tantamount to taking part in the war, which is no doubt logically correct, although the nations have agreed to permit the practice and not to regard it as a breach of neutrality, one cannot agree that "nursing schemes are worked out and stereotyped by the military authorities, without advice or suggestion from those who in war will have to bear the chief burden."

Lord Esher, although a member of the Committee of Imperial Defence and President of the County of London Territorial Force Association, appears to be unacquainted with the composition and duties of the Advisory Council and Local Committees of the Territorial Force Nursing Service. He further states that "it is doubtful whether any R.A.M.C. officer can claim an experience equal to that of the Convoy Corps and its medical staff." Taken literally, there is no question at all about it; no officer of the R.A.M.C. has ever commanded a unit composed solely of women, with women doctors, in any campaign, nor is it likely to happen. But if the suggestion is that few, if any, R.A.M.C. officers have ever administered a small hospital on the lines of communication in somewhat difficult conditions, it is rather hard to find any adequate reason for the statement having been made.

E. T. F. B.

THE TUBERCULOSIS YEAR-BOOK AND SANATORIA ANNUAL. Vol. i, 1913-14. John Bale, Sons and Danielsson, Ltd. Pp. lxxxv and 476, 10 by 7 in. Price 7s. 6d. net. Edited by Dr. T. N. Kelynack.

This has been prepared "in order to meet a widespread desire for a comprehensive and authoritative directory of agencies and institutions



organized and administered for the study of tuberculosis." Dr. T. N. Kelynnack, in an editorial review, notes first the international character of the anti-tuberculosis movement, the necessity for thorough instruction in all matters relative to the recognition and management of all forms of tuberculous disease, both before and after graduation. One may again point out that the history of the campaign against tuberculosis is in many ways like the attack on venereal disease; both were hindered by the absence of adequate knowledge and special instruction based on a true scientific method. Now, the steps which have been taken by the central government may result in the establishment of a national tuberculosis bureau for the organization and control of an effective national campaign. Following on the recognition of the great importance of tuberculosis in childhood, various means have been taken to limit the infection and to benefit those already infected: the establishment of sanatoria, grants towards the cost of treatment in institutions of non-insured persons and their dependents, and the Board of Education grant in aid of medical treatment, of which a part is specifically allotted to the treatment of tuberculous children.

A number of interesting photographs are given of new and inexpensive forms of shelter suitable for all classes of cases. These are contributed by Dr. T. S. Carrington and the authorities of the National Association of America for the study and prevention of tuberculosis; some show incidentally that the climate differs very greatly from that of Great Britain. The suggestions given on the construction of sanatoria may be useful under many conditions.

Dr. Nathan Raw describes "Bovine Tuberculosis conveyed from Animals to Man." For twelve years he has "devoted as much time as possible to collecting facts and making research into this difficult problem," in order to controvert Koch's statement that no regulation of the supply of food-stuffs from tuberculous animals was necessary. He reviews modern work on this subject, both by individuals; the Imperial German Commission, which "clearly proved that bovine tuberculosis is conveyed to children, often primarily from the intestinal and mesenteric glands"; and that of the British Royal Commission, which "amply justified the necessity for the most stringent measures in safeguarding the milk supply of this country." His general conclusions are summarized thus: "(1) Human and bovine tuberculosis are different varieties of a common species. (2) The human body is susceptible to both forms. (3) Bovine tuberculosis is frequently conveyed to humans, both by means of infected food and by direct infection. (4) These two forms of tubercle are antagonistic to each other. (5) A mild attack of bovine tuberculosis protects against phthisis pulmonalis. (6) Tuberculin from human sources has a marked curative effect on bovine lesions. (7) Tuberculin from bovine sources may have a curative effect on phthisis pulmonalis."

Sir Thomas Oliver contributes an interesting article on "Occupation and Tuberculosis." He points out that the relation between the work and the disease is complex, one must also consider the social habits and circumstances of the worker: "Occupation is largely responsible for the social position in which individuals find themselves, and, on the other hand, social circumstances to some extent dictate the kind of occupation which shall be followed. In a similar manner, heredity and



surroundings are not without influence." An analysis of the proportionate mortality in 22,987 deaths, according to the variety of dust (by Mr. F. L. Hoffman, of the Prudential Assurance of America), shows a maximum of 37·4 per cent where the dust was metallic, 28·6 per cent mineral, and 23·7 per cent organic, with intermediate values for other kinds of dust.

Professor G. Sims Woodhead writes on "Tuberculosis and Alcohol," summarizing the more important clinical observations and laboratory experiments which bear on this point. There appears to be sufficient evidence to show that, in Dr. Hector Mackenzie's words, alcoholism is "a powerful predisposing cause of tuberculosis," while Brouardel and Landouzy think that it is, perhaps, the most powerful influence in determining its propagation. Probably the only point in dispute now is the definition of alcoholism, and here the moderate drinker will never agree with the extremist on the other side. The practical point is that the general use of alcohol is diminishing, perhaps faster in the Army than elsewhere, and the use of alcohol in the treatment of disease has become infrequent and, one might say, infinitesimal.

Dr. Feldman, writing on "Tuberculosis and the Jew," points out that the Jews as a race might be expected to be particularly liable to tuberculosis; they are town-dwellers, engaged in indoor occupations, poor, and usually persecuted (think of the Bayswater Road), undersized, narrow-chested, and with a low infant mortality. Yet the *mortality* from tuberculosis is everywhere less than that in the population among whom they dwell. On the other hand, the *incidence* is as great as among their non-Jewish neighbours; but the disease runs a more chronic course, lasting often for years without altogether incapacitating the sufferers. Dr. Feldman thinks the true explanation of the *lesser mortality* is the greater sobriety of the Jews, their freedom from syphilis, and the greater care bestowed on the children by the mothers.

"Hilus Tuberculosis (root phthisis)" is discussed by Dr. R. Murray Leslie; it includes glandular or pulmonary tuberculosis at the hilus. Infection of the bronchial glands, a frequent sequela of whooping cough and measles, is extraordinarily common. It is often the first and may remain the only focus of disease in the body; is characterized by great tendency to spontaneous cure; but, on the other hand, the infection may lie dormant, to be followed in later years by serious consequences. Evidence is accumulating to show that the root, and not the apex, is the earliest focus of disease (especially in children), and the disease extends from the root along the branchings of the larger bronchi. Dr. Murray Leslie points out that this local infection may (as in the case of the milder joint lesions) produce some degree of protection against infection in later life. Farther on in the volume, Professor Emrys Roberts points out that this matter of hilus infection is still undecided, and that much more evidence is required before it can be entirely accepted. In diagnosis, radiographs are evidently of the first importance, to be supported by symptoms (presumably general), the reaction to tuberculin, and the results of opsonic examination. But it strikes one at once that such a method of examination can only be carried out in some comparatively large centre with skilled assistance, while, though no one of the methods of diagnosis is free from considerable fallacy, it is probable that the concurrence of all four would give a result which could hardly be



disputed. Until our organization has become more complete, it does not seem possible to make such an early diagnosis at all general.

Mr. H. J. Gauvain deals with "Conservative Methods in the Treatment of Tuberculous Diseases of Bones and Joints," writing with the authority of his experience at the Cripples' Home, Alton, and giving short abstracts of the methods followed there, with photographs of the splints, jackets, and cases used by him. He calls attention to the confusion between conservative and convalescent treatment; the former should begin when the patient is first attacked, and it does not mean the absence of treatment. Further, "surgical tuberculosis should no longer be considered merely a local disease."

Other articles are "Habitations for the Tuberculous in America" (Dr. T. S. Carrington), "The Institutional Management of Tuberculous Cases" (Dr. W. G. Kinton), very useful and suggestive even as regards the treatment of individual cases. Two valuable articles are those on "The Duties of a Tuberculosis Officer" (Dr. H. Hyslop Thomson) and "Post-graduate Instruction" (Professor Sheridan Delépine). Dr. Thomson emphasizes the fact that the tuberculosis officer must first of all be a clinician, and probably this is the best remedy against strangulation by red tape.

A series of articles deals with the tuberculosis movement in Scotland, Ireland, Canada, Australia, New Zealand, and South Africa, and others with schemes for Wales, the Metropolitan area, Edinburgh, Glasgow, Liverpool, Birmingham, Sheffield, Bristol, and half a dozen counties.

In a critical review, Professor Emrys Roberts ("Tuberculosis in Childhood") points out that the post-mortem evidence of intestinal tuberculosis in childhood is in substantial agreement with the results obtained by a skin reaction, and further that, in all probability, the incidence is even greater than is shown by these two methods. He also lays stress on the "natural vaccination" produced by early infections of a mild type.

There are also short critical articles on "Open-air and Residential Schools" (Dr. D. M. Taylor), "Tuberculosis of the Eye" (Mr. A. S. Cobbledick), "Of the Auditory Apparatus" (Mr. Adair Dighton), and on "Drugs in the Treatment of Pulmonary Tuberculosis," by Dr. Newman Neild, in which the following points may be noted: The present tendency to neglect symptoms; arsenic, "the hæmatinic of adult phthisis"; aluminium chlorate (Mallebrein's prophylactic), which is supposed to "follow the tonsillar route of the tubercle bacillus to the lung and yields there nascent chlorine"; in hæmorrhage, calcium neutral lactate, 30 gr. thrice daily for two days; but Dr. Neild has not seen any benefit from its administration for the limited time, nor harm from a prolongation of the administration. The addition of fat to the diet may help the calcium absorption. Morphia is now much less used. Amyl nitrite, used at once, may advantageously be followed by trinitrin.

Dr. Bridge Lees's method of "Continuous Antiseptic Inhalation" has met with considerable success. He says that Burney Yeo's inhaler is still the best, and that the following is a useful formula:—

℞	Creasoti	..	..	2 drams.
	Acid carbolic	..	..	2 "
	Tinct. iodi	..	..	1 dram.
	Sp. ætheris	..	..	1 "
	Sp. chloroformi	..	..	1 "

Six to eight drops on the inhaler every hour during the day and when awake at night.

The remaining articles can only be named: "Artificial Pneumothorax" (Dr. S. Vere Pearson), "Organotherapy" (Dr. H. H. Harrower), "Tuberculin and Serum Treatment" (Dr. D. M. Barcroft), and "Spengler's Immune Substances" (W. H. Fearis).

The rest of the volume is occupied by a full and detailed list of sanatoria and other institutions, with photographs and plans, while an appendix gives much information likely to be useful for reference.

This book is likely to be of very great use to anyone who has to deal with tuberculous cases, either as a clinician or an administrator, and the succeeding volumes will be looked for with interest. R. J. S.

**HYGIENE AND PUBLIC HEALTH.** By Louis C. Parkes, M.D., D.P.H., and Henry R. Kenwood, M.B., F.R.S. Edin., D.P.H. Fifth Edition. With illustrations. London: H. K. Lewis, 1913. Demy 8vo. Pp. xi and 736. Price 12s. 6d. net.

That the fifth edition of this well-known book has made its appearance while the preceding edition is not as yet two years old is ample proof of its popularity and usefulness, and it is so well known to officers of the Corps that further recommendation is hardly needed.

The arrangement of the contents remains the same, but much new matter has been added under the various headings to bring the work up to date. The part of chapter ix dealing with immunity and protection has been almost entirely rewritten, and the clear and concise manner in which it is put should enable the student to obtain a firm grasp of this difficult subject.

A few minor points appear to have escaped revision, such as the statement, which appeared in the last edition, that *Bacillus sporogenes* of Klein is the organism which causes "blowing" of tins of meat. The organism is, of course, *B. cadaveris*.

More prominence might also have been given to the body-louse as a causative agent in typhus.

We are glad to see that the description and illustration of the pan-closet and D-trap have at last been omitted.

The present edition keeps up the high standard attained by the former editions, and is eminently readable as well as being a reliable and authoritative guide for students in public health. H. B. F.

**HAZELL'S ANNUAL FOR 1914.** Edited by T. A. Ingram, M.A., LL.D. London: Hazell, Watson and Viney, Ltd. Pp. cxiii and 592. Price 3s. 6d. net.

This is the twenty-ninth issue of this well-known annual. It claims to give a concise account of the political, military, naval, financial, and commercial conditions of foreign countries and the Colonies, and a record of events of the past year. The military and naval articles include an account of the British Army and Navy, with their organization and administration in considerable detail, and briefer descriptions of the forces of foreign states. An interesting feature is the well-arranged history of the Balkan Wars, accompanied by a map showing the territories of the Peninsula as at present distributed. As might be expected in a work of this kind, medical situations are not dealt with.

The series of articles on scientific progress during the year is intended for the general public, and the section dealing with medicine and surgery will not impress the professional reader.

The political articles are supplemented by sufficient information regarding previous years as to make them intelligible, and the volume should prove most useful to those who wish to understand current events without extensive reading. A comprehensive index makes it most convenient for reference. C. J. C.

**GUIDE TO THE MICROSCOPIC EXAMINATION OF THE EYE.** By Professor R. Greeff. Translated by Hugh Walker, M.A., M.B., C.M. London: The Ophthalmoscope Press, Thayer Street, W. Pp. xvi and 86. Price 7s. 6d. net.

Professor Greeff, impelled by the cursory treatment given to the subject of the eye in handbooks on microscopic work, has designed the volume under review to "collect such matter as may prove specially useful to the ophthalmologist." No doubt the book fully realizes this object, but, in addition, it affords a summary of pathological technique calculated to be of great service to the general student of pathology. The precise and practical descriptions of the processes of hardening, embedding, mounting, and staining are exceedingly good, and should be of assistance both to the ophthalmologist and also the general pathologist, who is liable to be called upon to deal with any part of the central nervous system. The technique involved in the division of the bulb is clearly described. The brief résumé of the examination of the secretions and bacteria of the eye, contributed by Professor Stock, is disappointing after the thorough nature of the main portion of the book, and affords an object lesson on the danger of attempting to deal with an important subject in five pages. S. L. C.

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## Current Literature.

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**Intraspinal Injections in Syphilis.**—Swift and Ellis (*Journal of Experimental Medicine*, October, 1913, p. 428) find that injections of 2 mg. of salvarsan into the subarachnoid space of the spinal cord of monkeys, cause paralysis of the hind legs which continues for months, and the appearance of many leucocytes in the cerebrospinal fluid. One milligramme produces a cell count of over 1,000 per cubic centimetre although paralytic symptoms may be absent. Neo-salvarsan is somewhat less irritating. They quote Wechselmann, who ascertained that 1 mg. of salvarsan in 1 in 1,000 dilution gives rise to convulsions, paresis, and death in two to four days when injected into the brains of dogs and rabbits. Half a milligramme in a 2,000-fold dilution appears to be harmless. Wechselmann introduced 3 mg. of salvarsan into the spinal subarachnoid space of four patients suffering from tabes and general paralysis. In one, the lightning pains were aggravated and bladder atony came on. Marinesco treated thirteen cases with intraspinal



injections of 5 mg. of neo-salvarsan. The reaction was severe in most. Incontinence or retention of urine occurred in eight; paresis of the extremities in three; anæsthesia of the rectum, buttocks, and lower limbs in one. Levaditi and Mutermilch discovered in 1911 that the serum of animals to which salvarsan had been given intraperitoneally exerts a strong germicidal effect *in vitro*, which is not destroyed by heating the serum to 55° C. Swift and Ellis (*Münch. med. Woch.*, September 9, 1913, p. 1978) have treated thirty-two cases of tabes, general paralysis, and cerebro-spinal syphilis by introducing within the sac of the spinal dura mater 30 c.c. of a 40 per cent dilution of the blood serum of men to whom they had administered intravenous injections of salvarsan or neo-salvarsan one hour previously. Severe pains in the lower extremities sometimes ensued but no serious mishap resulted. In 72 per cent of the cases the Wassermann reaction of the cerebrospinal fluid became less marked or disappeared, and the number of cells decreased to the normal limit. Control intradural injections of normal serum left the pathological condition of the cerebrospinal fluid unchanged. As many as fifteen injections were given to one patient, combined with multiple intravenous doses of salvarsan and neo-salvarsan until 6 to 10 gm. of these substances had been administered. Improvement was observed in most, but no cure was effected. The authors think that this intraspinal therapy should be adopted in cases of tabes and general paralysis which are running a rapid course.

Levaditi, Marie, and de Martel (*Compt. Rend. Soc. Biol.*, December 19, 1913, p. 567) injected 5 c.c. of the heated serum of a rabbit which had received intravenously 0.07 gm. salvarsan per kilo. body weight one hour before, into the subarachnoid space of the brains of two general paralytics. Severe reactions followed; high fever, vomiting, convulsions, and collapse lasting four to six days. Afterwards, however, improvement was observed in both. The rabbit serum proved to be both trypanocidal and spirillicidal.

C. B.

**Typhus Fever in the Balkan War.**—Hegler and von Prowazek (*Berl. klin. Woch.*, November 3, 1913, p. 2035) state that a great epidemic of typhus fever broke out in the troops engaged in the Balkans during the early part of last year. It was at its height in April, May, and June. They had the opportunity of seeing several hundred cases, fifty of which they studied closely. Although the men had been worn out by field service, yet they withstood the infection in a surprising manner, probably on account of their abstemious habits and their good physique; the mortality was only about 10 per cent. Abortive attacks were frequent. The leucocyte count ranges from 8,000 to 12,000 in the first fortnight, though leucopenia is sometimes noted from the third to the seventh day. In every case there is a relative increase of the polynuclears, which number about 80 per cent. The nucleus is often much broken up, and the chromatin is distributed in the periphery of the cell. From the third day onward for about a fortnight alcohol-resisting inclusions are seen, which are best stained by means of Rocha-Lima's method of vital coloration, or by iron-hæmatoxylin after fixing in sublimate alcohol. Their detection may aid in distinguishing typhus from enteric fever and measles.



The experiments of Nicolle and others in the transmission of the typhus infection to the lower animals were confirmed (see JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, November 1912, p. 521). One and a half cubic centimetres of blood taken from a typhus patient on the sixth day of his illness were injected into the veins of a *Macacus rhesus*. Eight days later the animal developed pyrexia accompanied with a relative polynuclear increase and cell inclusions; it was killed on the sixth day of the fever, and the post-mortem appearance described by Nicolle and Gavino-Girard in their experimental infections were found. Another ape was inoculated with washed corpuscles, in which inclusions were present, of a patient in the nineteenth day of fever; this animal had a mild pyrexial attack twelve days later; inclusions were discovered in its polynuclears, which were increased in ratio. The disease was excited in a third macacus which was inoculated intravenously with a crushed pediculus vestimenti which had been removed from a typhus patient two days previously. The incubation period was twelve days. Half a cubic centimetre of the blood of a man in the seventh day of his illness injected into the heart of a guinea-pig induced an eight day febrile attack after nine days' incubation; the passage of the virus in the blood of this animal to another guinea-pig and thence to a *Macacus sinicus* was successful.

C. B.

**Bactericidal Power of Mastic Solutions.**—Borchardt (*Beiträge klin. Chirurgie*, October, 1913, p. 453) dissolves 40 grm. of mastic resin in 60 grm. of pure benzol and adds 20 drops of castor oil, and finds that this is a cheap and effective substitute for the proprietary mastic solution "Mastisol." Ten to twenty-five drops of this solution were added to 5 c.c. of broth cultures of bacteria. The mixtures were shaken and plated after twenty-four hours' incubation at 37° C. Ten drops inhibited the growth of streptococci and *Bacillus pyocyaneus*, but 20 to 25 drops were necessary to destroy staphylococci.

A camel-hair pencil infected with staphylococci when placed in mastic solution is not sterilized until after one hour's stay in the fluid. Streptococci are killed in thirty minutes, but twelve hours must elapse before *B. proteus* and *B. anthracis* are destroyed. Hence the varnish must be applied with a sterile pledget of wool or gauze which is renewed for each case.

Mastisol gave similar results. Water is not employed in the cleansing of wounds; benzin is used as a substitute. Borchardt does not apply the varnish to the wounded surface but to the surrounding skin only.

C. B.

**Austria, Voluntary Aid Resources for War.**—Stabsarzt Dr. Richter (*Das Rote Kreuz*, No. 8, 1913, p. 168) gives a résumé of the preparations made by Voluntary Aid Societies for war.

The Austrian Red Cross Society has in store a large quantity of medical and surgical material, among which may be mentioned 1,400,000 first field dressings for the army. It has also 35 medical store wagons with all the contents complete, and 3 mobile field medical store depots packed in 50 covered vehicles to replace material expended by field medical units.



For the transport of wounded the society has 500 ambulance wagons and 4,000 field stretchers. It has also 84 medical carts with complete equipment for mountain warfare. Two complete field hospitals have been provided for use with the fighting troops; the personnel is supplied from the landwehr. Three hospital ships can be fitted out by the society at short notice.

Recently voluntary aid detachments, consisting of two doctors, four to six male attendants, and thirty female nurses, have been organized to reinforce immobilized field medical units.

In the home territory the society has 39 reserve hospitals, 19 hospitals for slight cases, and 25 convalescent homes; together these afford accommodation for 317 officers and 9,400 men. In addition, beds have been promised in civil hospitals for 249 officers and 1,943 men, and in private nursing homes for 4,170 officers and 12,183 men. Thus the society can find accommodation for a total of 4,736 officers and 23,526 men. The railway rest stations, 50 of which have been prepared, can accommodate for one night 50 officers and 5,064 men.

A large sum of money has also been set aside to assist invalids, and widows and children of men injured in war, and to institute an information bureau for wounded and prisoners.

To combat epidemics 16 mobile field laboratories have been organized with a specially trained staff.

The Sovereign Maltese Order has prepared twelve hospital trains.

The Teutonic Order has a large number of ambulance wagons, and also four fully equipped reserve mobile field hospitals.

J. V. F.

**Extracts from the Annual Report on the Prussian Red Cross Society, 1911-12.**—The following extracts from a review of the Annual Report on the Prussian Red Cross Society for 1911-12, which appears in the *Deutsch. Kolonnenführer*, November 15, 1913, may be of interest as an indication of the interest taken in the work, and of the lines on which the development of the training is being effected.

The report is rendered by provinces, and a statement of the number of members trained, and of funds at the disposal of the various provincial societies, has been extracted and is given in tabular form at the end of this abstract.

(1) In the Province of Eastern Prussia the stores, in which the war outfit of clothing of the Red Cross Society was kept, were destroyed by fire. The loss was covered by insurance and a new outfit has been supplied. It is stated that the whole of the personnel required for mobilization on the lines of communication and in the home territory is available.

(2) In Western Prussia the Sanitätskolonnen and the Genossenschaft freiwilliger Krankenpfleger im Kriege are making arrangements for rendering first aid in case of accidents. Another line of activity is to make all possible preparations for equipping voluntary aid hospitals on mobilization, so as to be able to take in sick from the very beginning. This is being undertaken by the Red Cross Societies in conjunction with the Women's League, and the latter have acquired and stored large quantities of linen, &c. In this province, as in most others, they have a



cornflower day on which money is raised for the purpose of assisting veterans, &c.

In Posen the clothing of the voluntary aid detachments in a distinctive uniform has made great progress, thanks to financial assistance given by local branches of the society. In many places the voluntary aid detachments have made an arrangement to render first aid when required, and during the year 549 cases were so assisted. They also have a similar arrangement with the railway authorities, and their efficiency is tested from time to time by calling out the detachments at night and at other times without warning.

EXTRACTS FROM THE ANNUAL REPORT, 1911-12, ON THE PRUSSIAN RED CROSS SOCIETY, SHOWING IN TABULAR FORM BY PROVINCES, THE NUMBER OF BRANCH SOCIETIES, AND VOLUNTARY AID DETACHMENTS, TOGETHER WITH A STATEMENT OF FUNDS AT THEIR DISPOSAL.

Province	Branches of Red Cross Society	Number of members	Voluntary Aid Detachments (Sanitäts Kolonnen and Kriegersanitäts Kolonnen)	Number of members	Funds in hand and at interest in Bank
Eastern Prussia ..	31	..	48	..	..
Western Prussia ..	27	4,136	37	1,087*	M 84,700
Posen ..	46	6,000	51	2,182	M 89,089
Pommern ..	..	..	70	..	..
Silesia ..	19	..	98	..	M 86,867
Brandenburg ..	35	6,000	115	..	M 200,000
Saxony ..	..	..	90	..	M 183,000
Schleswig Holstein ..	81	16,137	32	880	M 18,426
Hanover ..	..	..	80	2,186	..
Hessen Nassau ..	41	12,621	88	2,609	M 23,552
Westphalia ..	47	15,864	119	3,884	M 470,388
Rhine Provinces ..	81	..	243	..	M 112,327

\* Of these, 365 on L. of C., 259 home territory, ready for mobilization.

The arrangements for mobilization are in a satisfactory condition. A large quantity of clothing and equipment for the personnel is kept stored in readiness in the commissariat barracks.

In Pommern the amount of personnel asked for by the military authorities is forthcoming; but there is not enough personnel for the voluntary aid hospitals and convalescent homes. There are several thousand beds ready for convalescent homes. Ten new hospitals of the Red Cross Society have been built, with a total of 586 beds.

In Silesia there is a society at Breslau with about 900 members associated with the railway, and many of the railway employees belong to this, and have received training in first aid which will be of use not only in peace, but during war.

In Brandenburg the voluntary aid detachments appear to render a great deal of first aid, and 15,947 cases are reported as having received assistance.

The voluntary aid detachments possess 625 stretchers, 8 ambulance



wagons, and 69 wheeled stretchers. There are 378 stations for reporting casualties, 13 posts where detachments are held in readiness to turn out 39 partially and 23 completely equipped stations for dealing with emergency cases. There are two institutions for the treatment of chest diseases at Küstrin and Frankfort managed by the voluntary aid detachments. Another society has a supply of sick room equipment for sending out on loan.

In Saxony special mention is made of the training of the voluntary aid detachments in fitting up auxillary hospital trains with the recognized suspension apparatus. An outfit is supplied by the military authorities for training purposes, and is circulated in the province during the winter. One detachment has it for a fortnight and they have two Sunday practices. The railway authorities provide empty trucks at a siding. At the second practice the next detachment for instruction in the use of the apparatus attends, and sees how it is done, and is able to practise by itself on the following Sunday.

In Hessen Nassau an application for assistance to purchase clothing and equipment for the voluntary aid detachments was not approved by the Central Red Cross Committee, but the latter promised to let them have by degrees at a very reduced rate the prescribed service uniform from the periodical turn-over in the mobilization stores.

In the Rhine Provinces the Red Cross Societies rendered first aid 43,668 times in 1911.

J. V. F.

**Practical Exercises by Voluntary Aid Detachments.**—Dr. Wollenberg, in a paper on this subject (*Deutsch. Kolonnenführer*, No. 24, 1913), quoted some very practical remarks from the report of Fürst zu Solms-Baruth, the Imperial Commissioner and Inspector of Voluntary Aid in Germany. The main points referred to were as follows:—

The management of practical exercises has made very considerable progress. Only in exceptional cases was a special point made of the searching for and dressing of wounded on the battlefield. In almost all cases attention was rightly directed to the transport and housing of wounded, especially so with improvised means. The disinfection of personal property belonging to, and of rooms occupied by, persons suffering from infectious diseases was also practised, and should prove a valuable training for war time. In certain cases it was noted with regret that the exercise was based on a military strategical disposition. The inspector strongly recommended that the practical exercises of voluntary aid detachments should be kept quite separate from military tactical exercises, as the two have nothing in common with each other.

J. V. F.

**The Employment of Women in Voluntary Aid in War.**—In the *Wien. med. Woch.* for January, 1914, Professor Dr. Alfred Exner and Dr. Cornelius Ritter von Massari contribute an interesting article on their experiences with volunteer women helpers in the Balkan War (*Über die Verwendung freiwilliger Krankenpflegerinnen im Kriege*). They emphasize the importance of organizing civilian medical assistance in peace time, and they state that in all discussions on the subject the



only point on which all are united is the necessity for employing volunteer female nurses and attendants, for without them the enormous amount of work cannot be got through. The writers had a ten months' experience in hospitals at Sofia, Philippopolis, Stara Zagora, and Baba-Eski, with staffs composed of volunteer nurses with little or no training. They treated 13,000 cases of wounds, 9,000 of which were out-patients.

In October, 1912, they took over a hospital of 360 beds at Sofia with two trained Bulgarian nurses, who, however, were soon transferred somewhere else. They had therefore to get through the work with volunteer nurses, most of whom had been through a course of training analogous to that given by the Austrian Red Cross Society. They came mostly from the middle classes, and many of them had had a higher education. After a few days the writers were able to decide which duties each nurse could best perform. They allotted two to twenty cases of severely wounded or to forty slighter cases, and they had to perform all nursing duties, except for the coarser cleaning-up work in the wards. There was, of course, also a night duty service, which was very heavy, as wounded often arrived at night. The work was heaviest in the first few weeks, as it included the organizing of the hospital and the training of the personnel.

The sterilization of dressings, instruments, &c., presented considerable difficulty at first. There is so much technical knowledge required in an operating-room that untrained assistance is of little use. For the first two months they had a sister of the Rudolfinerhaus in Vienna. She was succeeded by a volunteer, the wife of an advocate in Sofia, who did the work splendidly. Over 100 big operations were performed without sepsis occurring.

Massari left for Adrianople during the siege, and Exner worked alone in the Alexander hospital at Sofia for three months with these volunteer nurses, who assisted him at operations, and even administered anæsthetics.

With regard to the out-patient department the removal and renewal of dressings was largely left to the sisters, the line of treatment being indicated by the medical men. This involved considerable preliminary instruction, with emphasis on the use of sterile instruments and the disinfection of the hands. The good instruction bore fruit, for they had no erysipelas, which was common in most of the hospitals there. They also had typhoid fever and cholera to deal with. They attribute their success with these untrained assistants in part to the fact that the conditions of a war hospital are simpler than those of ordinary surgical wards in peace time; by grouping the various classes of patients (fractures in one ward, simple wounds in another, &c.), and instructing the attendants on what points to concentrate their attention, they can soon be taught to deal at any rate with a particular class of case.

The writers make some interesting remarks on the selection of volunteer nurses. In all wars doubtful characters come forward as volunteers; they are to be eliminated at once. There were well-founded complaints against nurses of being unwilling to work and of giddy behaviour. Another unwelcome kind of volunteer is the sensation-loving lady, who comes into the hospital dressed up to the nines with the idea of nursing, but who only gets in the way. If, however, the doctor can keep these characters out of his hospital, very good work can be done with volunteer nurses.



The writers were able to make their selection at Sofia, and that is how they were so successful in their experience compared with many other hospitals. Various hospitals, especially near the front, were filled with what they describe as "doubtful elements." They state that several of their rejections found employment in other hospitals. The writers do not wish to state that a volunteer can compete with a good trained nurse, but they came to the conclusion that an intelligent untrained volunteer is often better than a badly-trained professional nurse. J. V. F.

**Instruction of Red Cross Nurses in Germany** (Notiz, Kalender des Vaterland. Frauen Vereins für 1914).—The course of instruction is laid down in the official manual on the subject revised in January 1912.

In case of war each nurse must be prepared to serve for three months in the home territory. In return she receives free of charge a theoretical and practical training, and must attend three refresher courses at not longer intervals than one in two years. The theoretical instruction consists of at least twenty two-hour classes. The practical instruction is given in a civil or military hospital and occupies four to six weeks. The theoretical and practical instruction may be given concurrently or separately, and on completion of the course the candidate must pass an examination. If successful, she receives a copy of standing orders and the diploma for nurses of the Red Cross Society; she is then also entitled to wear the prescribed uniform when employed on any Red Cross duty. J. V. F.

**Plague among the Ouled Fredj, a Tribe in Morocco.**—Médecins Major Sacquépée and Garcin contribute an interesting article on an outbreak of plague in Morocco in the *Archives de Médecine et de Pharmacie militaires* for December, 1913.

Plague from native accounts appears to be endemic in the south of Morocco. It occurs sporadically in various districts due, no doubt, to the nomadic habits of the various tribes. The disease being on the increase, a medical commission was sent out in March, 1912, to investigate the epidemic, and they devoted their particular attention to the Ouled Fredj tribe.

They discovered plague in several domestic animals, viz., in camels, mules, sheep, and cats. From these various animals the bacillus of Yersin was isolated. They also suspected dogs and cattle but were not able to prove it. There was no epidemic disease amongst the rats, and of 4,247 rats examined not one was found diseased. Of 102 rats caught in or near infected dwellings and specially examined only one gave a plague culture from the splenic pulp.

The writers are of opinion that the disease is conveyed chiefly from man to man, that the rats there do not play an important rôle and that infected domestic animals are undoubtedly capable of infecting men.

The commission had considerable success in various villages with protective inoculation of 10 c.c. of serum along with 1 c.c. of vaccine. Out of 309 persons so treated only five developed plague, not more than five days after vaccination. Four men from the same villages who refused this treatment all developed plague.



General prophylactic measures should be directed not only against insects and rats, but also against domestic animals. J. V. F.

**Vaccination and Small-pox in Germany.**—In a lecture on the prophylaxis of disease, Dr. Beintker (*Das Rote Kreuz*, No. 26, p. 814, 1913) quoted the following statistics to show the effect of compulsory vaccination.

In Germany the average annual mortality per 100,000 of the population from small-pox was as follows:—

1860 to 1864	..	..	..	=	30.1
1865 „ 1869	..	..	..	=	37.4
1870 „ 1874	..	..	..	=	113.7

On April 1, 1875, vaccination was made compulsory for everyone. The effect was at once apparent in the mortality statistics for small-pox; the death-rate per 100,000 was as follows:—

1875 to 1879	..	..	..	=	1.8
1880 „ 1884	..	..	..	=	2.6
1885 „ 1889	..	..	..	=	0.64
1890 „ 1894	..	..	..	=	0.23
1895 „ 1899	..	..	..	=	0.05

J. V. F.

## Correspondence.

### THE PREVENTION OF MALARIA—A SUGGESTION.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I have thought for a long time that the suggestion of supplying every British soldier serving in India with a mosquito net would always remain a dead letter, and that no Government would be prepared to face the initial expense, still less the recurring expense. But when we realize that the greatest danger of contracting malaria lies in the fact that undiscovered malarial carriers sleep in the same barrack rooms as healthy men, and in the extreme facility with which mosquitoes can carry the malarial parasite from infected to healthy in these circumstances, it would appear sound and reasonable to ask that only infected men should be provided with mosquito nets at the public expense.

Every medical officer in charge of a unit should make himself thoroughly acquainted with the medical history sheet of each man in the unit, examine the blood of every man who has had an entry for malaria within recent years, and satisfy himself that the crescents cannot be found in their blood after at least three examinations. But even then I would recommend that these once infected men (though not proved to be carriers at the time) be provided with mosquito nets.

I venture to think that if this view were brought before those who are responsible for the prevention of malaria amongst British troops in India, it would be very favourably considered.

The expense involved is infinitely small, and the experiment is perfectly reasonable.

I may add that I have advocated this view in my annual medical report since 1911.

*Benares,*  
*February 10, 1914.*

I am, &c.,  
J. E. H. GATT,  
*Captain, R.A.M.C.*

Journal  
of the  
Royal Army Medical Corps.

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Original Communications.

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TRYPANOSOME DISEASES OF DOMESTIC ANIMALS IN  
NYASALAND.<sup>1</sup>

I.—*Trypanosoma simiæ*, sp. nov. Part III.

BY SURGEON-GENERAL SIR DAVID BRUCE C.B., F.R.S., MAJORS DAVID  
HARVEY AND A. E. HAMERTON, D.S.O.,  
*Royal Army Medical Corps*,

AND

LADY BRUCE, R.R.C.

INTRODUCTION.

IN previous papers<sup>2</sup> the morphology of *Trypanosoma simiæ* and its action on animals have been described. In this it is intended to give an account of its development in *Glossina morsitans*.

Before entering, however, into the details of this particular development, it may be of interest to take a general survey of the various modes of development which take place in the different groups of trypanosomes. It may then be laid down that there is a well-marked separate and characteristic mode of development in each of the three main groups of trypanosomes:—

In the first group—the *T. brucei* group—which includes *T. brucei*, *T. gambiense*, *T. evansi* (?), and *T. equiperdum* (?), the parasites develop—at least in the two first named species—at first through the whole length of the intestinal tract, excluding the proboscis, and eventually reach the salivary glands, where forms resembling

<sup>1</sup> Reprinted from the *Proceedings of the Royal Society*, 1913, B, vol. lxxxvii.

<sup>2</sup> *Proc. Roy. Soc.*, 1912, B, vol. lxxxv, and 1913, B, vol. lxxxvi.

those found in the blood of animals are developed, and these alone constitute the infective stage.

In the second group—the *T. pecorum* group—which includes *T. pecorum* and *T. simia*, the development takes place in the intestinal tract, including the labial cavity of the proboscis, and afterwards the trypanosomes reach the hypopharynx, or termination of the salivary duct in the proboscis. Here they revert to the original blood form and become infective. In this group trypanosomes are never found in the salivary glands, and no blood forms, or infective forms, are developed until the hypopharynx is reached.

In the third group—the *T. vivax* group—which includes *T. vivax*, *T. uniforme*, and *T. caprae*, the initial stages of the development take place in the labial cavity of the proboscis alone; later the hypopharynx is invaded, where again blood forms are developed, which again constitute the only infective forms. Here also there is no invasion of the salivary glands, and, in addition, no development takes place in the intestinal canal.

In all three groups the common factor which leads to the formation or development of the final or infective forms is the invasion of the salivary tract, and this is accompanied by a reversion to the original blood forms.

#### DEFINITIONS.

In this paper the word “proboscis” will mean the piercing apparatus of the “fly,” made up of the labrum, labium, labellum, and hypopharynx. There are two tubes in the proboscis: one for the passage inwards of blood, made up by the coalition of the labrum and labium, the other for the passage outwards of the salivary secretion—the terminal salivary duct or hypopharynx. The term “labial cavity” in this paper will mean the former, or tube for conveyance of blood, the word “hypopharynx” the latter, or duct for conveyance of saliva. In the past the use of the word “proboscis,” including both tubes, has given rise to a good deal of ambiguity.

The definition of the words “infected” and “infective” were given in a previous paper.<sup>1</sup>

The term “blood form” means a stage in the development of the trypanosomes in the “fly,” when there is a reversion to the original form found in the blood of animals, and from which the cycle of development originated.

<sup>1</sup> *Proc. Roy. Soc., B*, vol. lxxxvi (“Infectivity of *Glossina morsitans* in Nyasaland”).



THE DEVELOPMENT OF *T. SIMIÆ* IN *G. MORSITANS*.

Eight experiments were carried out with laboratory-bred flies. Two were positive and six were negative. The following table shows these eight experiments, the number of flies used, the number of infected flies found on dissection and the number of days which elapsed before the flies became infective :—

TABLE I.

Date	Expt.	Number of flies used	Experiment positive or negative	Number of infected flies found	Number of days before flies became infective
1912					
May 1 ..	502	20	—	..	..
June 27 ..	754	31	+	2	50
Oct. 9 ..	1477	17	—	1	..
Nov. 11 ..	1582	8	—	..	..
„ 15 ..	1602	20	—	..	..
„ 21 ..	1622	16	—	..	..
1913					
Feb. 5 ..	1847	45	+	7	20?
„ 10 ..	1856	16	—	..	..

It will be noted that there is a great difference between the two positive experiments as regards the time required for the flies to become infective. In the first fifty days elapsed, in the second only twenty. This is due to different temperatures under which the experiments were carried out. The first positive experiment was done during the coldest time of the year on Kasu Hill, when the mean temperature was 62° F. (16·6° C.), which is much lower than on the plains, the natural habitat of *G. morsitans*. The flies in the other experiment were kept in an incubator at a temperature of 83° F. (28·3° C.), and they became infective much sooner.

*Details of the Two Positive Experiments.*

The following table gives the principal details of the first positive experiment :—

*Experiment 754.*

TABLE II.

Day of experiment	Procedure	Remarks
1—3	Flies fed on <i>T. simiæ</i> -infected monkey.	Trypanosomes first appeared on the fifty-seventh day.
4	Starved.	
5—60	Fed on clean monkey.	



It is seen that it was not until the flies had been fed on the clean monkey for fifty-seven days that the animal showed trypanosomes in its blood. If we allow seven days for the average incubation period of the parasite in the mammalian host, then the monkey contracted the disease about the fiftieth day after the infecting fly had fed on trypanosome-infected blood.

The following table gives the principal details of the second positive experiment :—

*Experiment 1847.*

TABLE III.

Day of experiment	Procedure	Remarks
1—10	Flies fed on <i>T. simiae</i> -infected monkey.	Flies became infective on the twenty-sixth day after first infected feed; sixteen days after the last.
11	Starved.	
12—27	Fed on clean monkey.	

Since the flies of this experiment were fed on infected blood for a period of ten days, the time required for the trypanosomes taken up by the "fly" to multiply and regain their virulence cannot be accurately estimated. Allowing seven days for the incubation period it cannot be more than twenty days.

When the healthy monkey became infected, in order to separate the infective flies, those remaining alive were divided into three batches. Each batch was put into a cage and fed separately on a healthy monkey. The following table gives the details and results of feeding the three batches of flies :—

TABLE IV.

Experiment	Batch	Number of flies	Number of days fed	Result	Number of infected flies found
1847	1	12	7	—	0
1847	2	10	7	+	3
1847	3	13	7	+	3

The monkeys on which Batches 2 and 3 were fed showed trypanosomes in their blood on the sixth day after the first application of the flies. It is therefore highly probable that the flies infected the monkeys on the first day of feeding.

*Details of the Six Negative Experiments.*

The following table shows the method of procedure in carrying out the six negative experiments :—

TABLE V.

Experiment	Day of experiment	Procedure	Remarks
502	1—2 3—4 5—42	Fed on infected monkey. Starved. Fed on clean monkey.	All flies negative on dissection.
1477	1—3 4—5 6—45	Fed on infected goat. Starved. Fed on clean monkey.	One infected fly found on the fortieth day; proboscis and gut infected.
1582	1st 2nd 3—30	Fed on infected pig. Starved. Fed on clean monkey.	All flies negative on dissection.
1602	1st 2nd 3—35	Fed on infected pig. Starved. Fed on clean monkey.	All flies negative on dissection.
1622	1st 2nd 3—29	Fed on infected pig. Starved. Fed on clean monkey.	All flies negative on dissection.
1856	1—7 8—26	Fed on infected monkey. Fed on clean monkey.	All flies negative on dissection.

In Experiment 1477 a portion of the intestine of the infected fly was inoculated subcutaneously into a pig; the pig did not become infected.

Out of a total of 173 flies used in these experiments, 10 flies (5·8 per cent) became infected with a growth of trypanosomes in the intestines and in the probosces. It will also be seen that only 1 fly in 31 (2·7 per cent) became infected when the flies were kept at ordinary room temperature, whereas 4 became infected in 45 (9 per cent) when the flies were kept at a temperature of 28° C.

GENERAL CONSIDERATIONS REGARDING THE DEVELOPMENT OF  
T. SIMLE IN G. MORSITANS.

All the flies dying during the progress of the experiments were dissected. In the two positive experiments, out of seventy-six flies dissected, nine infected flies were found. The following table gives the results of the dissection of these nine flies :—



TABLE VI.

Experiment	Time, days	PROBOSCIS		Proventriculus	Crop	Fore-gut	Mid-gut	Hind-gut	Proctodæum	Salivary glands
		Labial cavity	Hypopharynx							
754	37	+	..	+	-	+	+	-	-	-
754	50	+	..	+	-	+	+	-	-	-
1847	16-26	-	-	-	-	+	+	-	-	-
1847	30-40	+	+	-	-	+	+	-	-	-
1847	31-41	+	+	+	-	+	+	+	-	-
1847	31-41	+	-	+	-	+	+	+	-	-
1847	31-41	+	+	+	..	+	+	..	..	..
1847	32-42	+	+	+	-	+	+	+	-	-
1847	32-42	-	-	+	-	+	+	-	-	-

From this table it will be seen that in seven out of nine flies dissected the labial cavity is found to contain trypanosomes. This is very different from what is seen in the similar table relating to *T. gambiense*. There not a single case of infection of the proboscis is recorded.<sup>1</sup>

At what stage in the development of the trypanosome the proboscis takes a part is not known. It is probable that the infection commences in the intestinal tract and moves forward into the proboscis, but owing to the difficulty of obtaining sufficient laboratory-bred *G. morsitans* the Commission have not, up to the present, enough evidence to establish this detail.

In the two infected flies found in the cage of flies, Experiment 754, it is to be regretted that the contents of the hypopharynx were not noted, but in all the infected flies found in Experiment 1847 this was done, with the result that the hypopharynx was found invaded by trypanosomes in four out of the seven.

Plate VI represents, at a magnification of 500 diameters, the labial cavity and hypopharynx of an infected fly. While the labial cavity contains clusters of large ribbon-like trypanosomes, the hypopharynx is swarming with small active forms resembling the original blood forms, from which the developmental cycle arose. When the plate is examined, the facility with which a tsetse-fly can infect an animal will no longer be a matter of wonder.

Finally, from the table it will be seen that in no case were the salivary glands invaded.

<sup>1</sup> *Proc. Roy. Soc.*, 1911, B, vol. lxxxiii, p. 516.

THE METHODS USED IN THE EXAMINATION OF THE FLIES.

The flies were dissected as described in a previous paper.<sup>1</sup> An additional method of examining the contents of the hypopharynx was to isolate infective flies by putting each fly into a separate tube, numbering it, and feeding the fly on a susceptible animal with a corresponding number on its cage. The numbers on the cages of animals which became infected indicated the tubes containing infective flies. These, when thus identified, were starved for twenty-four hours, in order to make them hungry. A tube containing one of the infective flies was then taken, and its mouth being covered with mosquito netting was applied to a large cover-glass placed on a man's finger. The hungry fly at once attempted to feed through the glass, and in poking about with its proboscis smeared the surface of the cover-glass with saliva. This was immediately fixed, stained with Giemsa, and examined.

THE TRYPANOSOMES FOUND IN THE PROBOSCIS.

Reference to the table above will show that in Experiment 754 two infected flies were found, one on the thirty-seventh day after feeding on an infected monkey, and one on the fiftieth day, and that the labial cavities of both flies were infected.

The fly that died on the fiftieth day was the one which no doubt actually infected the healthy monkey, since the animal showed trypanosomes seven days after the death of this fly, and no other infected fly was found. As these two flies died before they were isolated, the method of inducing them to salivate on a cover-glass was not used. When, however, the two probosces were examined in a drop of normal saline solution under a cover-glass, trypanosomes attached to the labrum were seen growing in colonies in the labial cavity. They were moving freely, and some detached individuals were swimming actively up and down the lumen of the tube.

It is to be regretted that the contents of the hypopharynx were not specially noted. These were two of the earliest experiments, and at that time the contents of the labial cavity and the hypopharynx were not differentiated.

In Experiment 1847 seven infected flies were found. It will be observed (Table VI) that the first was dissected on the sixteenth day after the last infected feed, and that the proboscis was not infected. Another fly dissected on the thirty-second day had also no infection

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<sup>1</sup> *Proc. Roy. Soc.*, 1911, B, vol. lxxxiii, p. 513.



of the proboscis. A third fly dissected on the thirty-first day had the labial cavity of the proboscis infected, but not the hypopharynx. The remaining four were found to contain swarms of trypanosomes in both the labial cavity and the hypopharynx. On examination it was observed that there were two distinct varieties. The one found in the hypopharynx closely resembled small blood forms of *T. simia*. They swarmed in the narrow tube, which had the appearance of being blocked up by their enormous numbers. These small blood forms of the parasite were readily distinguishable from those growing in the labial cavity. Those growing in the labial cavity resemble *Leptomonas*, and are peculiar in having their non-flagellated extremity prolonged to a snout-like extension. They are assembled in clusters and attached by their flagella to the inner surface of the labrum, their prolonged free extremity moving vigorously in the lumen of the tube (Plate VI, fig. 1).

The contents of the hypopharynx of a living infective fly isolated from Batch 2 was examined by inducing the fly to salivate on a cover-glass as described above. On examination of the stained preparations typical blood forms of *T. simia* were seen embedded in the saliva which the fly had ejected on the cover-glass in its efforts to reach the skin. Another infective fly was taken alive from its glass tube and its proboscis gently squeezed until a minute drop of fluid was observed at its tip, which was then lightly rubbed over a cover-glass. Here again typical blood forms of *T. simia* were found embedded in the salivary secretion.

In Experiment 1847 it is seen that a positive result is associated with the finding of infected flies in which *T. simia*, resembling those found in the blood of infected animals, are found in large numbers blocking up the tube of the hypopharynx.

The experiment of tempting the infective fly to feed through a cover-glass demonstrates the fact that when the fly salivates, as it undoubtedly does in puncturing the skin, these blood forms of the parasite are washed out of the hypopharynx with the saliva and are injected with it under the skin of the fly's victim.

Further examination of flies, by inducing them to salivate on cover-glasses, revealed the fact that sometimes the long, narrow intestinal forms of trypanosomes are ejected in large numbers on to the cover-glass. There is no doubt, therefore, that an infected fly has the power of regurgitating the contents of its proventriculus and intestines forward into the labial cavity and probably into the blood-stream of the bitten animal. It is conceivable that in this way the proboscis first becomes infected by the intestinal forms of

trypanosomes, which attach themselves to the inner surface of the labrum and enter the lumen of the hypopharynx, which they invade, however, only as far as the entrance of the two salivary ducts. Here in the chitinous hypopharynx they establish themselves and, bathed in the salivary secretion, finally complete their development into the infective blood form of the parasite.

It is a curious fact that neither the salivary glands nor even the salivary ducts beyond the hypopharynx have ever been found infected with *T. simia*.

It was proved by the Commission in Uganda that the blood forms of *T. gambiense* developing in the salivary tract were the virulent forms of the parasite, and it now seems also proved that the developmental forms of *T. simia* found in the hypopharynx represent the last and infective stage of development of this species of trypanosome in the "fly."

It may be noted here that in the negative Experiment 1477, in which an infected fly was found (Table V), the labial cavity was infected with the long forms of the parasite attached to the labrum, but most careful search failed to reveal infection of the hypopharynx with blood forms. In this fly the parasite had not attained the final and essential stage of its development—the reversion to the blood type—and so the fly was harmless.

#### THE TRYPANOSOMES FOUND IN THE ALIMENTARY CANAL.

The intestines of infected flies were generally packed full of trypanosomes from the proventriculus to the mid-gut. Sometimes the infection extended to the hind-gut, but never beyond.

Little need be said in regard to the developmental forms found in the intestines. One curious fact, however, emerges, and that is, that it is impossible to differentiate one species of trypanosome from another by the study of these intestinal forms. Whether it is *T. brucei* or *T. gambiense*, *T. pecorum* or *T. simia*, they present the same appearance. Perhaps on further work some differences may become apparent, but at present no difference has been found to exist. The most numerous forms are long, slender, ribbon-like, very active trypanosomes, which in a former paper<sup>1</sup> were called the normal reproductive type. By comparing Plate VII with the insets of that paper, the resemblance between the intestinal developmental forms of *T. simia* and *T. gambiense* will be apparent.

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<sup>1</sup> *Proc. Roy. Soc.*, 1911, B, vol. lxxxiii, p. 513.





FIG. 1.

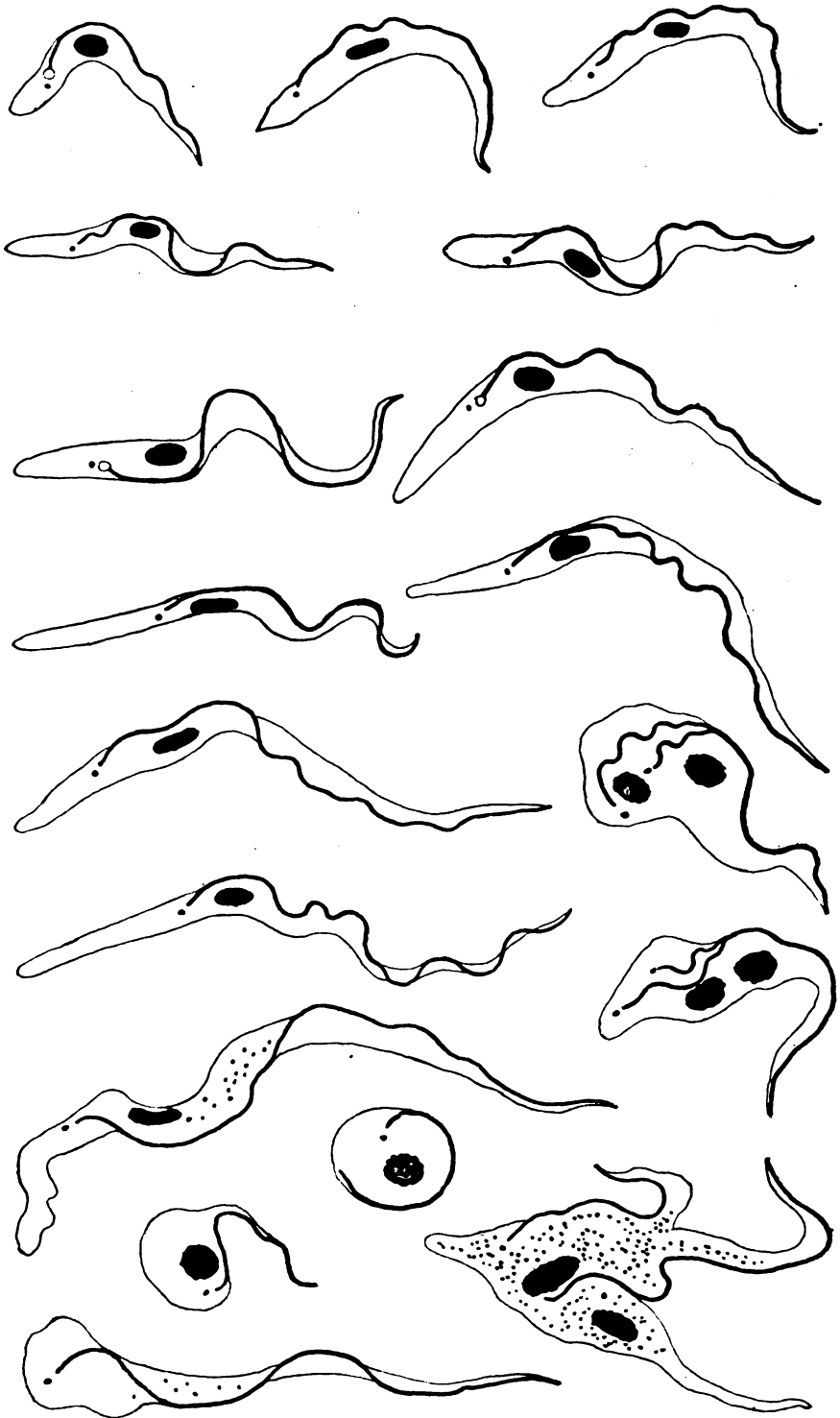
*T. simice* in labrum and hypopharynx.



FIG. 2.

x 750.

PLATE VII.



Major Hamerton del.

*T. simia* in gut of fly.

× 2,000.

# CONCLUSIONS.

(1) That *T. simia* can be transmitted from infected to healthy animals by the tsetse-fly *G. morsitans*.

(2) That *T. simia* multiplies in the intestines and in the labial cavity of the proboscis of the "fly." Here only developmental forms are found, never infective forms.

(3) That the *T. simia* growing in the intestines of the "fly" has no specific characters by which it can be distinguished from other species of pathogenic trypanosomes found in tsetse-flies.

(4) That the final stage of the development takes place in the hypopharynx, wherein the infective form of the parasite, similar in shape to the trypanosome found in the blood of infected animals, is produced.

(5) That the flies do not become infective until about twenty days after their first infected feed.

## DESCRIPTION OF PLATES.

### PLATE VI.

FIG. 1.—Appearance of the labial cavity of the proboscis of *Glossina morsitans* with *Trypanosoma simia* growing in clusters attached by their flagellar extremities to the inner surface of the labrum. Living and unstained,  $\times 750$ .

FIG. 2.—Appearance of the hypopharynx in the same fly, showing innumerable small and active *T. simia* almost blocking up the lumen of the duct. Living and unstained,  $\times 750$ .

### PLATE VII.

Intestinal developmental forms of *T. simia*. These do not differ in appearance from the developmental forms of other species of pathogenic trypanosomes found in the intestinal tract of tsetse-flies.

## THE ABDERHALDEN REACTION.

BY COLONEL C. BIRT.

THE Abderhalden reaction is the method employed for the detection of the ferments which the animal body elaborates to cope with any foreign protein or carbohydrate which has been introduced parenterically, that is by injection into the subcutaneous tissues, veins, or peritoneum.

Under the process of digestion in the alimentary canal proteins are broken down into much simpler bodies, the end-products of which are the amino-acids. The amino-acids enter the blood-stream, and are again synthesized by the organs into the protein of their own cells. Now it was a subject for inquiry how proteins are disposed of when introduced into the body otherwise than by the digestive tract. Since the year 1906 Abderhalden has been occupied in this study, and has ascertained that specific ferments are formed which dissociate the protein molecule into polypeptides and amino-acids. The serum of a dog has no action on edestin (vegetable albumin) until the animal has received subcutaneous injections of this substance; the serum then acquires the property of breaking up the edestin molecule; each of the dissociation products has its own specific rotation, hence it is possible to watch the splitting of the protein into polypeptides and amino-acids by means of the polarimeter. In a similar manner the ferment invertin is produced in a dog's serum after subcutaneous injections of cane sugar, by which the cane sugar is split into glucose and levulose. During the last two years investigations on these lines have been pursued with great diligence. Abderhalden's reaction is used in the diagnosis of pregnancy, cancer, dementia precox, exophthalmic goitre, status lymphaticus, tubercle, scarlet fever, diseases of the liver and alimentary canal, and for medico-legal purposes.

Schmorl had made the observation that during pregnancy chorionic villi are swept into the maternal blood-stream. Abderhalden surmised that a ferment acting on placental tissue should exist in the blood. He took the serum of pregnant women and animals, and incubated it at 37° C. with placental tissue in a dialysis tube; if a proteolytic ferment were present, the placental tissue would be broken down, amino-acids would be formed which would pass through the dialysing membrane into the dialysate. If no ferment capable of splitting the placental protein existed, then no amino-acids would be found in the dialysate. He discovered the placental ferment in the serum of women and animals that were



pregnant, but in no others ; hence his conjecture was correct. In order that the reaction may occur, however, it is not necessary that the chorionic epithelium should be detached ; for in mares and sheep this does not happen, but the test is positive.

To carry out the test, a fresh human placenta is cut into small pieces which are washed in water to free them from blood, for if blood remains in the tissue normal serum reacts. The placenta is next boiled for ten minutes in water to which two drops of acetic acid have been added ; the washing is repeated and the tissue is again boiled for five minutes. The water in which the placenta is boiled is tested with ninhydrin. If the result is negative, the fragments of coagulated placenta are preserved in chloroform water covered with toluol ; if positive the boiling must be repeated. About 5 or 10 c.c. of blood are withdrawn aseptically from the vein of the patient before breakfast, for blood abstracted during digestion contains amino-acids which will vitiate the test. Wallis, however, advises that the blood should be taken in the evening, since the dialysable substances are diminished when the body is fatigued. The blood is placed in the ice-chest for four hours, the serum decanted and centrifuged, the perfectly clear serum pipetted off and used at once. There must be no trace of hæmoglobin in it. The best dialysis thimbles are those made by Schöps, of Halle, 50 mm. long and 16 mm. wide. After soaking in water under toluol for some days their permeability is tested with albumin and peptone. They should retain the former, but should allow dialysis of the latter. One cubic centimetre of serum and 0.25 gm. of the crushed coagulated placental tissue are placed in the dialyser which is inserted in a flask containing 20 c.c. of sterile water. Toluol is poured on the surface of both liquids. After sixteen hours' incubation at 37° C., 10 c.c. of the dialysate are withdrawn by a pipette and boiled for one minute with 0.2 c.c. of a 1 per cent solution of ninhydrin. If the serum was obtained from a pregnant woman, the ferment in it splits the placental protein into dialysable peptones and amino-acids which give a blue colour when boiled with ninhydrin. In the absence of pregnancy the serum has no dissociating action on the placenta, therefore no dialysable substances pass through the dialyser, and no blue colour results on boiling the dialysate with ninhydrin. Ninhydrin is triketohydrindene hydrate

$\text{C}_6\text{H}_4 \begin{array}{c} \diagup \text{CO} \diagdown \\ \diagdown \text{CO} \diagup \end{array} \text{C}(\text{OH})_2$  and will detect the presence of one part of amino-acids in 15,000 of water ; but it gives the same colour reaction with every protein, hence the greatest care is necessary to prevent any contamination of the outside of the dialysis thimble with the serum

or other protein-containing matter. Aseptic precautions must be observed throughout. Many controls are required. The test must be applied to the serum of the patient without the addition of the placenta; to the serum of the patient heated to 60° C. for thirty minutes, by which ferments if present are destroyed, mixed with placenta; to the placenta alone; and to normal and known pregnancy sera with the addition of placenta; and to normal serum alone. The dialysates in every case, except where the unheated serum of pregnancy and placental tissue are combined, should give no colour when boiled with ninhydrin.

Instead of separating the amino-acids from the serum and placenta by means of the dialyser, it would appear to be simpler to coagulate the serum by boiling, and to test for the amino-acids in the filtrate. Williams and Pearce have been successful with this method; Bourne also adopts it. King finds that it is necessary to incubate the serum and placenta for twenty hours at least, and after coagulating the albumin by heat with the addition of a few drops of acetic acid, to add 0.3 c.c. instead of 0.2 c.c. of the ninhydrin solution to 10 c.c. of the filtrate, or in other words the reaction is not so delicate as when the dialyser is employed. This is explained by the coagulated albumin combining with amino-acids much in the same way as the coagulum would take up dye-stuffs if they were present in the filtrate. The large majority of investigators therefore make use of the dialysis thimble.

To perform the polarimeter test for the presence of the specific ferment, it is obvious that a transparent solution of placental peptone must be substituted for the prepared placental tissue. A mixture of 1 c.c. of a 10 per cent placental peptone solution with 1 c.c. of the serum is placed in the polarimeter tube and the rotation recorded. The tube is then incubated at 37° C. and the rotation noted at intervals for forty-eight hours. With normal serum the maximum change of rotation does not exceed 0.03. The serum of pregnancy causes a rotation of 0.2 or more.

Abderhalden in his work, "*Abwehrfermente des tierischen Organismus gegen körper-, blutplasma-, und zellfremde Stoffe, die Nachweis und ihre diagnostische Bedeutung zur Prüfung der Funktion der einzelnen Organe*," the second edition of which was published in June, 1913,<sup>1</sup> states that he has investigated more than 300 cases in order to establish the diagnosis of pregnancy or the contrary, and that he has been correct in every instance with one doubtful exception. The literature of the subject is voluminous;

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<sup>1</sup> A third edition has just appeared.



he gives sixteen pages of references. Among recent contributors we find that Schlimpert reports seventy-nine cases of pregnancy diagnosed by Abderhalden's reaction without a failure. Williamson and Wallis examined thirty control patients in all of whom the serum was negative, and twenty pregnant or recently delivered women in whom it was positive. Leith finds it a valuable method. Gottschalk obtained reliable results in thirty-three pregnant and six non-pregnant women, but two other women with enlargement of the uterus not caused by pregnancy reacted positively, so that he thinks other methods of diagnosis must not be neglected. Lichtenstein examined seventy-six cases, forty-two of which were gravid women; the serological diagnosis agreed with the clinical in all. The reaction appears according to Abderhalden as early as eight days after conception, and lasts till a fortnight after parturition. The test has proved of service in the recognition of ectopic pregnancy. The process has not escaped criticism. Aschner, for instance, obtained a positive response in sixty-one pregnant women, but 30 per cent of fifty-nine controls also answered to the test. The results of Werner and Winiwarter were so inconstant that they pronounce the method to be of little or no use in practice. The sceptics, however, are in the minority.

The serum of cancer patients dissociates cancer tissue. Eppstein examined thirty-seven patients afflicted with carcinoma, and in all but one the test with cancer albumin was positive; in forty-six controls it was negative. Frank and Hermann, however, could ascertain no difference between the serum of pregnancy and that of cancer; for they found that the sera of fifty-four patients suffering from malignant disease digested both cancer tissue and placenta, and that the serum of pregnancy also digests cancer protein. Deutsch and Köhler have reported similar results. Gambaroff, on the other hand, states that he has made only one mistake in the serological diagnosis of fifty tumours; cancer serum splits cancer tissue, and sarcoma serum sarcoma tissue. Mayer also thinks that Abderhalden's test is of great importance in the investigation of malignant disease; the serum of eighteen cancer cases was positive. Wolter holds identical views, for fifteen cancer sera reacted positively to cancer tissue. Petroff found that the Abderhalden reaction gives a larger percentage of successes than the meiostagmine test in the diagnosis of malignant growths.

The Abderhalden reaction has been extended to the study of mental diseases. Fauser has carried out 3,000 tests in 500 mental cases; and Wegener 3,000 in 600 patients. Both authors are convinced of its far-reaching importance, and compare it to the

application of the Wassermann reaction to this branch of medicine. The difficulty of distinguishing dementia præcox, with its grave prognosis, from less formidable conditions which simulate it, are well known; but here Abderhalden's reaction comes to our aid. The serum of dementia præcox contains ferments which act on testicular or ovarian tissue according to the sex of the patient, and on the brain. The serum of healthy or hysterical people has no effect on these proteins. These observations have been confirmed by Fischer, Bundschuh and Roemer, Beyer, Theobald, Neue, and Mayer. In epilepsy immediately after the seizures, in degenerative processes of the brain such as general paralysis, cerebral syphilis, senile dementia, alcoholism, in meningitis and chorea, the serum contains a ferment which dissociates the brain tissue; this ferment is absent in mania and neurasthenia, hence the test gives good indications as to prognosis. The blood of melancholic patients splits liver protein in many instances. In neuritis, muscle tissue, and if atrophy of muscles is present nerve tissue also, is digested by the serum.

Defensive ferments against the thyroid gland exist in the serum of the sufferers from exophthalmic goitre, myxoedema, and endemic goitre.

The serum of patients suffering from tubercular disease of the lungs contains a ferment which acts on both healthy and tubercular lung, and according to some investigators, on tubercle bacilli, but the action is not specific, for cleavage products are formed also by normal serum.

Schultz and Grote found that the serum of scarlet fever cases from the fifth to the thirty-second day of the disease dissociates both normal and scarlatinal lymphatic glands.

Heyner ascertained that in two cases of sympathetic ophthalmia, and in eleven of traumatic cyclitis, the serum split the uvea of pigs' eyes, but in six others not caused by injury the test was negative.

Kabanow maintains that the serum of patients suffering from diseases of the alimentary canal dissociates the mucous membrane of the part affected, and that he has been able to distinguish between affections of the stomach, duodenum, and appendix by this means.

Breitmann uses the test in the diagnosis of disease of the liver.

Deutsch and Köhler observed that the reaction with kidney tissue was positive in seventeen out of twenty-two cases of nephritis, and that the serum of rheumatic patients dissociates tonsillar but no other tissue.

Abderhalden's reaction has its medico-legal aspects, for, according

to Waldstein, cleavage products appear on digesting the serum of a doe-rabbit, taken twenty-four hours after coitus, with a rabbit's testis. Mayer also has detected a ferment in the blood of women abstracted shortly after cohabitation, which splits testicular tissue.

Steising believes that the defensive ferments are closely allied to amboceptors, since old sera, or those which have been inactivated by heat, regain their power when they are reactivated with fresh normal serum, which therefore contains complement.

As the outcome of this observation Corin and Welsch assert that they have discovered the specific placental ferment in lochial stains two to sixty-five days old. The blood-stain is macerated in a small quantity of physiological salt solution: after filtration the liquid is mixed with fluoride of sodium to inhibit bacterial growth, and is subjected to a preliminary dialysation with an equal quantity of normal male rabbit or male guinea-pig blood; the process is repeated if necessary until the dialysate no longer gives the ninhydrin test. The liquid in the dialysis thimble is then heated to 60° C. for thirty minutes. This, on the addition of fresh rabbit or guinea-pig serum, is now ready for the test with placental tissue. Controls of the liquid alone, of the liquid and rabbit serum without placenta, of the rabbit or guinea-pig serum alone and with the addition of placenta, and of the placenta alone are prepared.

The writer experimenting with the dialysis test has found in common with all investigators that there are many pitfalls to be avoided. Less than half the dialysis thimbles which he employed were reliable. Absolute cleanliness is essential when making use of such a delicate reagent as ninhydrin. After injecting rabbits with human red blood-corpuscles he has ascertained that their serum possesses a ferment which acts on boiled and washed human erythrocytes.

Oeller and Stephan, in a critical review on the clinical worth of Abderhalden's reaction which appeared in the *Münchener medizinische Wochenschrift* of January 6 and 13 of this year, lay stress on the importance of examining the serum both in the active and inactive condition, with a variety of tissues; moreover, controls with known positive and negative sera must be made in a parallel series. It is requisite to know the capabilities of, and to give a number to, each diffusion thimble. As observers acquire experience in the Abderhalden reaction, they gain more confidence in their results.

The conclusion which one draws from a perusal of the literature of the subject is that the Abderhalden reaction affords great assistance in diagnosis.

## CONCERNING 1654 AND 1756.

BY COLONEL R. H. FIRTH.

THE above figures are not register numbers of some new synthetic drugs, but dates which mark important periods in the history of the English in India. They are more than this to us, for they are dates associated with the names of two doctors whose connexion with, and the initial part they played in, the sequence of events which led to the consolidation of British power in Bengal is liable to be forgotten by the present generation. The names of those two doctors are Gabriel Boughton and John Zephaniah Holwell. True, neither were army surgeons, but their claim to a place in the pages of our Journal rests on the fact that both were men possessed of that adventurous spirit, that wide outlook on affairs which sees in the rôle of a doctor something more than the mere practice of physic, and that essential versatility which makes the army surgeon to be a man among men, and renders his career at once fascinating, honourable, and unique.

Of Gabriel Boughton it is difficult to learn much. Son of a well-to-do yeoman, and born at Newton-le-Willows, in Lancashire, in 1623, he was originally intended for holy orders and proceeded to Merton College, Oxford. Abandoning theology, he graduated there in medicine. The attractions of the profession appear to have been small, as in 1648, through the influence of his uncle, he obtained a writership in the newly formed Company of Merchants of London trading to the East Indies and, in the following year, found himself at their factory at Surat, where he seems to have been both a clerk and the doctor. At that time Shah Jehan was emperor of Delhi. It so happened that in 1654, the emperor's elder and most favoured daughter, Jahanara Begum, was badly burnt in endeavouring to save a dancing girl whose skirt had caught fire. Shah Jehan was so distressed that he sent a message to Surat, commanding that the doctor of the English factory there should come to court immediately. Gabriel Boughton went at once and succeeded in saving Jahanara. When Shah Jehan bade him name his reward, Boughton would take neither gold nor jewels, neither place at court nor grant of land. All he asked, in return for his services, was permission for the East India Company to trade in Bengal from that date. Shah Jehan granted this, and Boughton's name comes down to us as not only the man who primarily secured

for England a right of entry into Bengal, but also as one of that band of Englishmen who at all times have been content to spend themselves, without personal reward, for the sake of their country. Boughton subsequently returned to England, prospered as a merchant, and died at Bath in 1689. He was not the first Englishman to visit the court of the King of Delhi and solicit a trading concession. In 1593, during Akbar's time, three Englishmen had reached Fatehpur Sikri, bearing a letter from Elizabeth. One died, one remained in Akbar's service, and the third, Ralph Fitch, returned to London, traded as a merchant and founded the Company, to which a Royal Charter was given in 1600, and in whose service Boughton was in 1654. Subsequently, in 1609, Captain Hawkins gained access to the emperor Jehangir, and, later in 1615, he was followed by Sir Thomas Roe. In spite of autograph credentials from James I, neither of these men secured any real concessions for the Company to trade beyond the Gujerat area, and it was left to Doctor Boughton, by virtue of his rôle as a medicine man, to secure that first permit to trade in Bengal which ultimately led to the consolidation of British power in India. For that achievement, pregnant with little foreseen consequences, his memory is preserved.

Of John Zephaniah Holwell we know more, and rightly so, for his name is associated gloriously with one of the saddest incidents in our history in India. He belonged to a prosperous Devonshire family which had suffered severely in support of the Stuart cause during the Commonwealth. His father was a London merchant, and his grandfather an Astronomer Royal. J. Z. Holwell was born in Dublin on September 23, 1711, and at an early age was sent to school at Richmond in Surrey, where he showed an aptitude for classics. His father intended him to be a merchant and sent him later on to Holland, where he learnt French, German, Dutch, and book-keeping. He next passed into a banker's office in Rotterdam, but owing to his bad health he returned to England and expressed a decided aversion to mercantile life. His father decided to make him into a doctor and accordingly articted him to a surgeon in Southwark, from whom he passed to the care of Mr. Andrew Cooper, the senior surgeon of Guy's Hospital. On leaving hospital, Holwell engaged as surgeon's mate on board an Indiaman, which arrived in Calcutta in 1732. From here he made four voyages in the Company's ships as surgeon, visiting Mocha and Jeddah and acquiring a fluent knowledge of Arabic. Subsequently, he was employed on shore, going twice with the escort which accompanied

the annual trading column to the Company's factory at Patna. On these occasions, Holwell had the rank of surgeon-major. For a while he was surgeon to the factory at Dacca, but returned to Calcutta at the end of 1736, where he was elected to an aldermanship in the mayor's court. In the spring of 1740, Holwell was appointed assistant surgeon to the hospital, and having been brought on the fixed establishment by a despatch from the Court of Directors, dated March 22, 1742, he soon became principal surgeon to the Presidency, and for two years in succession he was elected mayor. Owing to bad health, Holwell returned to England in 1748, and, during the voyage home, drew up a scheme for correcting abuses in the zemindari Court at Calcutta; this scheme he presented to the Court of Directors, who, adopting it, appointed him perpetual zemindar with fiscal and magisterial powers and a seat in Council, twelfth in seniority. This post he accepted and returned to India in 1751.

Holwell was now a covenanted civilian on a salary of two thousand rupees a month, a vast change from his former status as a surgeon when to use his own words, "he could charge no more than fifty rupees for three months' attendance and medicine." Owing to the success of his administration, the Directors raised his pay to six thousand rupees a month and withdrew the prohibition against his rising in the Council, which was a condition originally imposed on his appointment. By 1756, he had risen to the position of seventh in Council. To appreciate the position it is necessary to go back a little. Consequent on the concession which Boughton had obtained from Shah Jehan, the Company had obtained a footing through Job Charnock, their agent in Madras, for trade at the village of Sutanutti on the bank of the Hughli in Bengal. This settlement went through many vicissitudes, but by the end of 1696 it included the contiguous villages of Calcutta and Govindpur. The fifty years which followed brought many ups and downs but a gradual extension of trade and jurisdiction for the Company. By Holwell's time, Calcutta had reached an advanced stage of industrial progress, and its area extended three miles along the bank of the river. Nearly midway between these limits were the factory and a little fort. This, from a military point of view, was faulty, in bad condition, and weakened by propinquity of warehouses and other buildings which limited effective defence.

The year 1756 brings us to the close of the viceroyalty of the Nawab Ali Verdi Khan, who ruled Bengal for the king of Delhi.



The Company had been on fairly good terms with this viceroy. He was succeeded by Siraj ud Dowla, who was not slow to find reasons for quarrelling with the English settled in Bengal, and early in June of that year led an army of 50,000 men to attack and sack Calcutta. The garrison of that place consisted of about 250 men, including Eurasians and Portuguese half-castes. In face of the threatened danger strenuous efforts were made to increase the garrison, and by the middle of June it mustered 515 in all, of whom only 196 were Europeans. Early on June 16, Siraj ud Dowla approached with his army and attacked. This attack was resisted successfully till the morning of the 18th, when a most fierce assault was made on the battery to the eastward and some outposts in the jail close to it. This post was held by a detachment commanded by Holwell who, after seven hours' defence, had to abandon it and fall back into the fort. Here the utmost disorder prevailed, characterized by dissensions among the military and civilians accompanied by cowardice on the part of Mr. Drake, the Governor, various members of Council, and not a few of the military officers. During the 19th the situation became worse, and in the course of that day the governor, the adjutant-general, and chief civil and military officers embarked for the ships lying in the river. The remnant of the garrison now insisted that all ideas of command based upon official standing or seniority should be disregarded, and the absolute command given to the man best fitted for action in the crisis. Although he was not the senior member of Council left behind, the general voice of the garrison called on Holwell to take the command. This he did and, counting the numbers left after the great desertion, found that the garrison was but 171 all told. By noon of the 20th, twenty-five of these had been killed and many wounded. The enemy continued to attack fiercely and by four in the afternoon of June 20, 1756, the fort and whole settlement of Calcutta had been wrested from the English. For a due understanding of what was to come some explanation is necessary as to the arrangements of certain parts of the fort.

The main entrance to the old fort of Calcutta, which was on a different site to the existing Fort William, was through a fortified gate in the eastern curtain. At each side of this gate extended a range of chambers or barrack-rooms. These were built on to the curtain and divided into sections by light cross walls, the roofs of the rooms so obtained being the parapeted terrace of the curtain. We are concerned only with the rooms between the gate and the south-east bastion. The first was a guard-room, the next a barrack-

room, while, beyond it and separated by a partition wall, came another room adapted for and used as a cell for prisoners. In this room, which was eighteen feet by fourteen feet, there ran a raised platform just wide enough for men to lie. The door of this room opened inwards and communicated with the barrack-room. Originally, this room, like the other rooms, had opened by two arches into a twelve-foot verandah on the outer edge of which were two corresponding arches. To convert this room into a safe place for the confinement of prisoners, the two inner arches had been bricked up to two feet from the top, thus leaving to this chamber two small semicircular windows, which were heavily barred. This arrangement resulted in any so-called ventilation being only into the verandah. We thus conceive this chamber to be bounded on the east and south by dead walls, on the north by the partition wall and door leading to the barrack-room, and on the west by the bricked-up arches, the barred windows in which faced straight into the late afternoon and evening sun on a Calcutta day in June, and admitted only such air as circulated in the heated verandah similarly exposed to the west.

On the fort falling into the enemy's hands, 146 persons became prisoners; they were of all colours, many wounded, and all in a state of the greatest exhaustion. Among them was one woman, a Mrs. Carey, wife of a captain of one of the Company's ships who also was one of the captives. At nightfall, orders were given that all the prisoners should be placed in safe custody for the night. The safest place was deemed to be the prisoners' room just described, and which, from that time has been known as "the Black Hole of Calcutta." Holwell, having been amongst the first to be thrust into this confined and ill-ventilated room, gained a place by one of the windows. The horrors of what happened through that night can be well imagined; they are described in Holwell's own letters and graphically reproduced in "Echoes from Old Calcutta" by Busteed. As that night was the hottest and sultriest of the year, it needs little imagination to picture the agonies endured by those confined in that room for the ten hours which followed from 8 p.m. of June 20, 1756. Even in that charnel house, Holwell seems to have kept his head and acted as the chief of that forlorn party of 146. Ultimately, like many others, he became unconscious but, when the door was opened at 6 a.m. he was still alive. Of the 146 who entered that terrible room only 23 came out alive, and among these were Holwell and Mrs. Carey, but not the latter's husband. In the same holocaust, Mrs. Carey

lost also her mother and a sister aged 10; she herself was but 18 at the time, but lived for many years, dying in Calcutta on March 28, 1801.

It is questionable whether Siraj ud Dowla can be held to be directly responsible for the confinement of Holwell and his companions in the room in which so many met their death, as he appears merely to have given orders that they be held safely for the night; but he cannot be acquitted of callousness and want of care to see that they were not inhumanly treated, nor of want of concern for their welfare when he learned next morning of the terrible sufferings they had undergone during the night. All the interest he displayed was to order that the four chief survivors, namely, Holwell, Burdett, Court, and Walcot be detained to furnish information as to concealed treasure, and that the others quit the place before sunset under the penalty of cutting off their noses and ears. Most of these survivors made their way to the ships. The four detained were sent to Murshidabad; that journey lasted a fortnight, the prisoners being conveyed by river in a leaky boat without shelter for night or day. Their food was rice and the river water, and as all were covered with boils and heavily ironed, their sufferings even after release from the "black hole" must have been intense. On arrival at Murshidabad, they were led in chains through the crowded city. This ignominious treatment seems to have been imposed without orders from Siraj ud Dowla as, when he reached Murshidabad, he ordered the release of Holwell and his companions, directing that they be conducted wherever they wished to go, and that care be taken that they suffered no trouble or insult. On being released from Murshidabad, Holwell and his companions made their way to the ships at Fulta. A few months later, Calcutta was recovered by Clive, and Holwell returned to the scene of his recent troubles. Being shattered in health, he was sent home in February, 1757, and on the voyage wrote his account of the siege and loss of Calcutta, and the harrowing incidents which followed. In consideration of his remarkable and meritorious services the Court of Directors nominated him to return to Bengal as successor to Clive, this he declined, but accepted the appointment of second member in the Council. He returned to Calcutta in 1758, and succeeded Clive as acting Governor of Bengal on the latter proceeding home in February, 1760. He held the governorship but a few months, as he did not get on well with the Court of Directors. In consequence of persistent differences of opinion between the Council in Calcutta and the Court of Directors at home, the latter

ordered the instant dismissal of Holwell, Manningham, Frankland, and Mackett, all members of Council; but, before the despatch reached India, Holwell asked permission to resign the service. His letter, making this request, contains the following passage: "The many unmerited, and consequently unjust remarks of resentment which I have lately received from the present Court of Directors, will not suffer me longer to hold a service, in the course of which my steady and unwearied zeal for the honour and interest of the Company might have expected a more equitable return." The permission was given and he retired from the service in September, 1760.

Holwell, whose association with the profession of medicine had long been lost sight of, returned to England and settled down to literary pursuits, chiefly in respect of the mythology, cosmogony, fables, and festivities of the Hindus. In these fields he soon became an authority. Holwell was twice married; three of his children survived him, namely, Colonel James Holwell, of Southborough, Kent, a Mrs. Birch, and Mrs. Swinny. Holwell himself died at Pinner near Harrow on November 5, 1798. An obituary notice of his death says he was one "in whom brilliancy of talents, benignity of spirit, social vivacity, and suavity of manners were so eminently united as to render him the most amiable of men."

Complimentary as that notice is, it does but imperfect justice to the merits and nobility of the man. No one can read the records of the survivors of the "black hole" and fail to be impressed by the obedience and affection which Holwell inspired, and which the sufferers maintained for him in that den of horrors. When the struggle for water at the windows had been going on for four hours, and Holwell's immediate companions were dead at his feet, he thought it useless to prolong his own pain and misery while being slowly pressed to death by the pressure of those struggling behind him. He, therefore, asked leave to fall back to the centre of the room and so make space for others nearer the window; there he fell down near the sleeping platform and was found still alive on the next morning, lying among a heap of corpses. As suggestive of the confidence which Holwell's abilities inspired, it may be mentioned that when, in November, 1759, Clive denuded Calcutta of fighting men, he did not hesitate to place the old fort in the command of Holwell with a small force of militia. But, probably, the best proof of his merits lies in the high estimation in which he was held by his fellows when they called on him to take the command, at a time when all was critical and alarming; if this

be not enough, we have the unselfish veneration evinced for him by his struggling and suffocating fellow captives in the moment of their own great agony. And what was Holwell's reward for being the gallant defender of Calcutta's fort, and the asserter of the nation's reputation, when all those who should have stayed had run away? Thanks, grudgingly given, and within three years, a sentence of dismissal.

Bad as was the treatment meted out to Holwell by the Court of Directors, succeeding generations of his countrymen in Calcutta displayed even less respect and tenderness for his memory. At his own expense Holwell erected a monument to the memory of those who had died in the "black hole." This he placed over their common grave, which was in the fort ditch. One would have expected that every Briton in Calcutta would have regarded its preservation as a personal trust. No, it was allowed to go to ruin and all trace of it so lost that no knowledge survives of what became even of its inscription tablet. It was left to Lord Curzon to remove this reproach from the premier city of India, and to that viceroy Calcutta owes the erection of the present-day Holwell monument, and the inscriptions on it giving the carefully gathered names of those who perished during her short siege. The present monument is not on the site of the one erected originally by Holwell; it really marks the site of the prison in the old fort and known as the "black hole." It was impossible to do more than this, as the site of the common grave has long been obscured by the erection of the Custom House which now stands where the old fort stood. All that is to be seen of the original fort are two lines of twelve arches, a portion of the piazza that was within the south curtain.

One hardly knows how far an article of this kind will appeal to the readers of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, but the knowledge of men like Boughton and Holwell should ever be an asset. Both were doctors and both did their country good service. The only discordant note which forces itself on one's ear, is that which brings home the fact that neither of these men really earned the repute they have by the sole merit of Physic as a profession. This is a characteristic defect of our calling too obvious even in our day. Wherein lies the remedy it is difficult to say; we can but hope that it will be found. Certainly neither Boughton nor Holwell would be known to us in this day on their actions as doctors; they come down to posterity as Boughton the trader, and Holwell the Governor. In fact, to this day, few men

in the Civil Service of India know or think of Holwell having been other than a covenanted civilian of Bengal. If too often, the practice of Physic mean but failure to gain the honours and glories of Society, we can console ourselves with the thought that the heroism of failure is often greater than the heroism of success. This may be a crude philosophy, but it is satisfying to the simple-minded, to the altruistic, and to the unambitious. The hardship lies in the circumstance that all doctors are not simple-minded, not altruistic, and not devoid of ambition. To many of these latter, it is to be feared that often the possession of a medical qualification is as a millstone round the neck.

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## ANTIMONY IN THE TREATMENT OF SYPHILIS.

BY MAJOR W. B. FRY.

*Royal Army Medical Corps.*

IN work relating to the influence of drugs on pathological micro-organisms, it is necessary to have a clear conception of the precise ends in view, for of necessity the mind accepts as a primary idea that a rapid and staggering deathblow to such micro-organisms is the chief concern, and this mental attitude may tend perhaps to exclude slightly more subtle ideas. The fundamental ideas with which the work dealt with in this paper is concerned are those which found their origin in the observations made by some of us, two or three years ago, in the Wellcome Tropical Research Laboratories, Khartoum, on what has been called "the extrusion of granules." This extrusion phenomenon and its significance, which was followed up somewhat elaborately by Captain Ranken and myself with regard to trypanosomes, was made the subject of a joint communication to the Royal Society, and afterwards reprinted in this Journal with illustrations. Our observations give some grounds, at least, for assuming the possibility of this phenomenon being part of a reproductive effort of this class of protozoa. We had also observed granule-shedding or extrusion in spirochætes, including amongst others that of spirochætosis in fowls and the *Treponema pallidum* of syphilis.

It will be seen from the accounts of these investigations that the occurrence of granule extrusion as a phenomenon in the life history, or rather life cycle, of these parasites is such that considerable significance may be attributed to it, sufficient, at least, to form the basis of a trend of ideas leading up to experimental work. Moreover, this further conclusion had been come to, a conclusion which more recent work has considerably strengthened, that extrusion which appears to take place normally, is influenced by the administration of some spirochæticide or trypanocide, such as an arsenic or antimony salt. These metallic salts which destroy the parasite cause, before destruction, a precipitation of the function of extrusion as though the first effect of the drug were to sting into activity a reproductive function in an effort to maintain the life of the race before the individual perishes in an adverse environment.

With regard to *T. pallidum*, it was under the influence of a drug, "606," that granule shedding or extrusion was first seen to occur, no doubt because the drug had stimulated the function so that it was the more readily observed. Mercury, as ordinarily administered, has shown a power of stimulation similar to "606," though not so marked. Later observations showed that the phenomenon occurs normally, without the administration of drugs. The consideration which must necessarily have the greatest claim on our attention is the fact that the phenomenon is a normal occurrence and not merely a drug-caused phase, yet it will now be clearly understood why such drug-caused phenomena should be the basis of ideas in investigations in which drugs such as antimony and arsenic are to be used as active agents.

It will now be relevant briefly to narrate and consider some observations made on marked specific cases, for these have bearing on the considerations dealt with above—in fact, such considerations in a large measure caused the undertaking of the special work with metallic antimony.

*Case I.*—Native soldier, Civil Hospital, Khartoum. *Outstanding lesions*: Rupial sores, indurated, raised  $\frac{1}{4}$  to  $\frac{1}{2}$  in., fairly clean, on back and hands. Lesions found before treatment to be crammed with *T. pallidum*; very few other micro-organisms. Duration of observations, one fortnight. During administration of mercury, gradual diminution in numbers of *T. pallidum*, granule shedding, easily and often observed, attenuation of individual parasites.

An observation made during the action of mercury was that the parasites found deeply and nearer the blood supply were earlier and more noticeably affected than those more superficially situated, which were affected last. "606" given on tenth day. Twenty-four to forty-eight hours afterwards *T. pallidum* could no longer be found in lesions.

*Case II.*—Egyptian soldier from Military Hospital, Khartoum. *Outstanding lesions*: Mucous plaques well marked on scrotum and side of thigh. Duration of observations, twenty days. Mercury given and pushed somewhat. Very rapid disappearance of treponema in four to six days. Very marked contrast to Case I, the parasite being quite impossible to find in observations after fifth day. Granule shedding and attenuation well shown in this case. "606" given—all lesions disappeared.

*Case III.*—Soldier, British Hospital. *Outstanding lesions*: Sore, indurated, sloughing. Observations made in conjunction with Captain O'Farrell, R.A.M.C.

Repeated examination of same sore by dark ground only showed "granules," but these, very typical, agreed to by us both.

Seven weeks later typical *T. pallidum* recovered from the skin lesions, indurated papules, and mucous patches on the throat. From skin lesions were found what appeared to be stages from granule to spirochæte.



Reproduced from impressions drawn at time of observation. Presuming for the moment that a primitive element such as a granule is carried from an original focus to the particular one, and there undergoes transition by stages to an adult spirochæte, the reader can put a construction on any of the figures. Short, stumpy spirochætes of relatively few curves appeared to be the early forms of the spirochætal stage. (Not drawn to scale, dark ground, monochromatic light.)

After administration of "606" lesions cleared up about sixth day; granule shedding well observed in this case.

*Case IV.*—European. *Outstanding lesion*: Soft sore, with tendency to induration. Examinations made repeatedly on tenth to twentieth day after infection. No treponema found, case developed severe syphilis some weeks later, and the typical parasites were recovered from the lesion.

*Case V.*—Egyptian, Civil Hospital, Khartoum. *Outstanding lesion*: Sore, indurated, large and sloughing. Early examinations showed numerous granules. Spirochæte seen once only. No specific treatment. Thirty days after last examination patient showed mucous patches, typical rash and early papular formation on skin. "Young forms of spirochætes" seen, similar to those in Case III, obtained from deep scrapings from indurated papules. Patient sent away for treatment with "606."

These five cases will give enough material for the discussion of some points relevant to this paper. The above notes are practically exact extracts from my rough notes made at the time of each observation, and in writing of "granules" having been seen, I should like to emphasize the fact that both Captain O'Farrell and myself were at that time also actively engaged daily in observing granule shedding, formation, etc.; he more especially on granules in fowl spirochætosis and I on trypanosome granules. We had,

therefore, every opportunity of mutually checking our observations, and plenty of material for comparison. Further, we were not left unassisted by other members of the staff. To resume: In the first place it is desired to draw attention to the fact that these cases give the experimental record of the precipitation of the shedding of granules under the influence of drug action. Captain Ranken, in his work on the same phenomenon in trypanosomiasis, has made this so abundantly clear that it is not necessary further to elaborate the subject with regard to *T. pallidum*. Just the same thing happens with the spirochætes of fowl spirochætosis if "606" is given to the bird. The next point to be observed is the fact that in some sores which were proved to be the precursors of syphilis, adult spirochætes were not found in examinations made early in the course of the primary lesion.

It is not intended here to insist that what we call granules were necessarily those of *T. pallidum*, for such an assertion is certainly open to criticism. However, as far as I am personally concerned, the infection of the primary lesion in syphilis, postulating for the moment that granule shedding is a vital and reproductive function, appears to be a very understandable occurrence if it be supposed to take place in some such way as follows:—

The infection is brought about by the more primitive element, the granule, which is either directly transferred into some superficial lesion of the tissue to be infected or extruded by adult spirochætes finding themselves in a fresh environment. If these assumptions are correct, both things most probably happen at the moment of infection. There are, of course, also theoretical considerations to favour this view, but I shall not dilate on them as they are sufficiently obvious. Further, in this connexion I think that in the trypanosomiasis of horses, known as dourine, which is spread by sexual connexion, the granule or primitive element plays the rôle of infective agent, some such happenings as those described above taking place. This is pure presumption. I have no experimental evidence.

The fact of spirochætes found nearer the more vascular region of a lesion being earlier affected after drug treatment, needs no comment beyond an emphasis on the accuracy of the observation.

The possible young, more primitive, or developing forms of spirochætes are to be our last consideration with regard to the material obtained from these five cases. Forms such as these have, as everyone knows, been often observed and figured. In Khartoum, where cases of neglected syphilis were obtainable, these forms were

seen so clearly and definitely as to make their study an engrossing one. The most beautiful pictures were obtained in a case where the parasite was found in indurated skin lesions with intact epidermal surface, and where slides of exudate could be got free from any other form of micro-organisms. Consideration will not here be undertaken of the various developmental forms and their explanations, of which accounts have been published lately. Some contributions are certainly interesting, if only from the point of view of being something of a triumph in nomenclature.

As those who are more directly interested in tropical disease will probably be aware, intravenous injection of metallic antimony is being used at the present time with remarkable success in the treatment of sleeping sickness in the Lado Enclave by the Sudan Sleeping Sickness Commission. Captain Ranken, in his late communication to the Royal Society, drew attention to the extraordinarily good results obtained in the treatment of yaws by this drug, given in the same doses as for cases of trypanosomiasis. For several reasons, both economic and scientific, it was deemed expedient to carry out this treatment for the destruction of *T. pallidum* as the effect in *S. pertenuis* had been so marked. Moreover, we have record of two cases of syphilis treated by intramuscular injections of metallic antimony cream, which had very favourable effects on the symptoms.

In our series thirty-three injections of this drug have been given, and in no case have reactions occurred severe enough to contra-indicate administration intravenously. In the majority of cases no constitutional effect was produced at all.

The antimony prepared commercially by Burroughs Wellcome and Co. is in the form of a fine powder, so fine as to be almost colloidal. It is obtained by a method of electrolysis, and appears as a black powder very closely resembling soot.

The administration is very simple; the powder is stirred into a few cubic centimetres of physiological saline solution, and the very fine particles, which are light enough to remain in suspension in the fluid for a certain time, are run into the veins by a simple form of apparatus such as is used in the administration of salvarsan. Clean saline is run in finally to flush all the particles through.

Our usual doses have been from 50 to 60 mg. (about 1 gr.). Captain Ranken has used and still uses doses of considerably larger amounts—180 to 200 mg. The results so far have not been in any way startling. In three cases out of the fourteen, positive



Wassermann reactions became negative, in one case remaining so. Specific lesions such as sores, glands, skin eruptions, were very evidently improved. Rashes appeared to be only slightly affected, and a case of severe condylomata was apparently very little benefited, if at all, by the drug. So far the effects of the drug cannot be compared with results produced by a full intravenous dose of salvarsan. It must be remembered that the dosage is not determined, and necessity for caution in the amount administered is, of course, obvious. It would seem that a succession of doses at short intervals would be the best line of administration.

In most cases the reaction is negligible; the patients are little disturbed after receiving the dose. In one case there was very distinct collapse, and in another case a thrombus formed at seat of injection. Headache more or less severe has been complained of in about 20 per cent of injections. Some care and experience is required in giving the drug, as the escape of any of the powder in suspension outside the lumen of the vein sets up considerable local reaction and necrosis.

The more experience one gets with this method of giving metallic antimony, the more one is impressed with its safety and practicability. Three doses of 70 mg. were given to a case of very old standing actinomycosis. On none of these occasions was any constitutional reaction complained of by the patient. The apparent effect of the drug was to cause a marked discharge of the fungus in the pus from the old tracts, from which fluid they had not been discoverable for fourteen months. The ultimate effect, if any, is not yet determined.

So far as microscopic observation could be carried out on the cases of syphilis treated with antimony the effect of the drug on the parasite corresponded more or less exactly with the clinical results. Certainly in the case of severe condylomata quoted above the parasite seemed remarkably untroubled by the presence of metallic antimony in the blood-stream. But the opinion arrived at was that antimony has the same effect in its action on the parasite as that ascribed to salvarsan and mercury in the earlier part of this paper. It may be mentioned here that a dose of metallic antimony given intravenously in a case of human trypanosomiasis dooms to destruction within an hour every adult trypanosome in the circulation or lymph glands, as far as it is humanly possible to ascertain.

PRÉCIS OF FOURTEEN CASES OF SYPHILIS TREATED WITH INTRAVENOUS  
INJECTIONS OF METALLIC ANTIMONY.

			Doses		
1.	C. T.	Lesions manifestly benefited	2	{ 50 mg. 50 "	{ Wassermann reaction became negative, but did not remain so.
2.	F. D.	Lesions except condylomata manifestly benefited	4	{ 50 " 60 " 50 " 60 "	{ Wassermann remained positive.
3.	J. H.	Lesions very markedly improved	2	{ 70 " 60 "	{ Wassermann became negative, but did not remain so.
4.	A. S.	Lesions disappeared ..	2	{ 60 " 60 "	{ Wassermann became negative and remained so.
5.	P. W.	Lesions improved..	1	60 "	{ Wassermann remained positive.
6.	E. B.	Lesions improved..	1	50 "	{ Wassermann remained positive.
7.	P. C.	Lesions improved..	3	{ 50 " 60 " 50 "	{ Wassermann remained positive.
8.	J. M. C.	Severe case, very markedly benefited	2	{ 60 " 60 "	{ Wassermann remained positive.
9.	J. P.	Some considerable benefit, then relapse	5	{ 50 " 50 " 60 " 60 " 70 "	{ Wassermann became less positive and then reverted.
10.	C. M. C.	Considerable benefit ..	2	{ 60 " 60 "	{ Wassermann remained positive.
11.	G. N.	Little benefit, thrombus at site of injection	1	60 "	{ Wassermann remained positive.
12.	C. S.	Drug appeared to have little effect on lesions	2	{ 60 " 60 "	{ Wassermann became less positive.
13.	A. B.	Decided improvement in lesions	3	{ 60 " 60 " 60 "	{ Wassermann remained positive.
14.	N. D.	Lesions much benefited ..	3	{ 40 " 60 " 60 "	{ Wassermann remained positive.
Cases 14			Doses 33		

## SOME HISTORICAL NOTES ON THE BRITISH MEDICAL SERVICES.<sup>1</sup>

BY LIEUTENANT-COLONEL J. T. FOTHERINGHAM.

*Canadian Army Medical Service.*

WHEN informed a year ago of your kindness in selecting me to preside over the fortunes of this Association, I accepted the honour with much searching of heart and, I trust, with a due sense of duty.

From relatively small beginnings, due to the initiative of Colonel Sterling Ryerson, the Association has grown under the fostering care of successive Directors-General, and not the least I may, without invidious comparison, mention our present Director-General, Colonel Jones; until now we may congratulate ourselves upon, at least, a lusty adolescence and a fair promise of being thoroughly useful to our own branch of the Service and truly serviceable to the interests of the country and the Empire. More particularly do I beg to congratulate myself and you, gentlemen, upon the presence here for the first time of an official representative of our parent corps, the Royal Army Medical Corps. This honour is greatly enhanced by the circumstance that the official representative is a gentleman so well known in all the medical services of the world and in all the scientific circles of the Continent and of this Western Hemisphere. Recognizing in all the circumstances my own inability to contribute anything of outstanding scientific merit or of any first-hand technical value, I have selected as my subject, although I well know it is one which could not be exhausted in one brief paper or in many, the history of the British medical services, and propose, by way of food for our *esprit de corps* and nutriment for our patriotism, to give you some brief and rather disconnected historical notes on the medical service of the British Army, more particularly as we have seen it in Canada.

The Medical Service in Canada has existed in its present form for some thirteen years, and inheriting, as we do, the traditions of the British Army Medical Service, we feel that we have reached a stage of our development in which we can, for a time, forget the rudiments, even the younger of us, and betake ourselves for our encouragement and enlightenment to the history of the Service to

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<sup>1</sup>An address given to the Association of Officers of the Medical Services of Canada at the Annual Meeting, Ottawa, February 24, 1914.

which we have the honour to belong. I need not apologize for this; no one gets far into the Service or becomes much advanced in education of any sort without learning the value of historical and biographical knowledge, and we are all delighted to see that our Director-General, in what is sure to be a most interesting and recondite paper, is following up this same line. Who would stand up and say, for instance, that though the charge of the Six Hundred at Balaclava was a military error, the memory of that wild ride has been of no value to the British soldier?

“ When can their glory fade ?  
O the wild charge they made !  
All the world wondered.  
Honour the charge they made !  
Honour the Light Brigade,  
Noble six hundred.”

My sentiment was well expressed by the French officer who watched the charge and as he saw it launched, exclaimed “ *C’est magnifique ! Mais ce n’est pas la guerre.*”

If you will pardon a personal allusion, I would like to confide to you that the circumstance which mainly turned my youthful thoughts, at about 11 years of age, to military training was the introducing of my hand through a broken cupboard door into a book-case in the public school I attended for a short time as a boy in the country, which contained part of the books of a disused mechanics’ institute library, and the abstraction therefrom of the first book that I could reach, which was Napier’s “ *History of the Peninsular War.*” Of course at that tender age I could only appreciate the battle pictures painted in that magnificent resounding prose of which Napier was a master; and I mark as another epoch in my military training after a later second reading of Napier, a much more recent and careful reading of Colonel Henderson’s two-volume “ *Life of Stonewall Jackson,*” a work which cannot be read too often or by too many officers in any army in the world, for there was a soldier, one of the finest ever born into this sinful life. Let me remind you too of Lord Macaulay’s dictum—“ *A people which takes no pride in the noble achievements of remote ancestors will never achieve anything worthy to be remembered with pride by remote descendants.*” And I think you will admit with me that at this juncture of our evolution as a people we, in Canada, need more than anything else, in order that we may appreciate our privileges, and so rise to a more adequate conception of the duty that goes with privilege, and to a fuller knowledge of the struggles and



agonies and victories and defeats and deaths and triumphs of our predecessors in the service of the British Crown. We need to realize the preciousness of the privilege, for instance, of walking into Westminster Abbey and calling it our own, a privilege denied to our American cousins, or the privilege of sharing in the glories of British rule in India, that we may awaken to a proper sense of our duty, not only to the Mother Country, nor in the second place to ourselves, but also to the other partners in the Empire, say to Australia and New Zealand, washed as they are by the waters of the same Pacific Ocean as ourselves; but that would be a topic for a whole evening by itself. I should like to point out first the influence of the Army medical officer upon our medical evolution in Canada, and especially in Upper Canada and in Nova Scotia and New Brunswick. Let us contrast the present condition of medical education and practice in Ontario with that to the south of the line.

At the beginning of the last century when the United States began their separate existence they had a population of about four millions. The first medical school in that country, now the Medical Faculty of the University of Pennsylvania, had been established only thirty-five years; the Medical Department of King's College, New York, now Columbia, thirty-three years; Harvard, seventeen years; and the Medico-Chirurgical Faculty of Maryland, eleven years. In the whole country there were but two general hospitals and one medical journal, and the only medical libraries were one each in connexion with the hospitals of New York and Philadelphia. The animosities and hatreds of their Revolutionary War drove American students, not to London and Edinburgh, but to Berlin and Paris, so that the whole genius of medical education in the United States has been, and still is, of the continental, rather than the British type. At the same time a struggling little community, totalling about 70,000 souls, along the fringe of the forests north of the Great Lakes, especially Erie and Ontario, was dependent for its medical attendance mainly upon the medical officers of the British troops in the country. These were, as a rule, men of high character, fine training, and good social position, and up to about the year 1840, when the effects of the MacKenzie Rebellion began to be felt in collegiate circles, their social position naturally kept them in close touch and sympathy with the ruling powers, whom we may roughly name by the old title, "The Family Compact." The honourable character and traditions of the profession of the Motherland were thus transferred at a crucial period to our rough community, and it would be inspiring to consider, if one had time, what manner of men these were.



On the wall of a main corridor in the General Hospital in Toronto, founded in 1819, it is said, there hangs a life-size portrait of one of the best of them, Dr. Christopher Widmer, who resigned his commission in the Service and began civil practice in York in 1815. For thirty-five years he was chairman of the Medical Board of Upper Canada, which controlled admission to the practice of medicine, until, at Confederation in 1865, the present Ontario Medical Council was formed. A study of that portrait as you pass by will do more to show you what I mean than any words of mine. Of him Sir William Osler says: "One picture on the canvas of those early days lingers in the memory, illustrating all the most attractive features of a race which has done much to make this country what it is to-day. Widmer was the type of the dignified old Army surgeon, scrupulously punctilious, and in every detail regardful of the proprieties of life." Dr. Christopher Widmer has justly been called the Father of Medicine in Ontario. He and his Army associates, most of them trained in the schools of London, Edinburgh, and Dublin at a period made brilliant by the labours of Jenner, Percival Pott, the Hunters, Benjamin and John Bell, and other great teachers, stamped their influence indelibly upon the medical profession of the Province and early fixed the character of our clinical teaching and practice. One good result of their friendliness with the governing powers of the time, because they were Tories by instinct and association, was that they induced these authorities to lay down sound laws in the establishment of medical training, particularly in King's College, Toronto, which began operations in 1844. The memories and experiences of the War of 1812 had given them a probably well-grounded fear of the training which our own men might get in the schools to the south of us.

The last of these men whom I have in mind was the late Dr. James H. Richardson, who was the first medical officer of the Royal Grenadiers in Toronto, and completed his training at Guy's Hospital in the late forties. His father lost an arm in the attack on Sackett's Harbour in the War of 1812 to 1815. Even down to the present day the result of their labours persists in our relative immunity from most of the evils of free practice and quackery, of which our neighbours to the south are just beginning to rid themselves. Our students still go to London rather than to the Continent, and still retain the ideals of British practice, in which the art of men like John Cheyne, Graves, Stokes, Bright, Addison, and Latham prevails, rather than the drier, colder scientific

methods of the French and German schools; though I trust that in thus exalting the art I am not misunderstood as depreciating the science of our calling. I may, however, point out, before I change the subject, that most of the great discoveries which have lessened the suffering of mankind have been, until recent years, credited to our race. Sydenham introduced quinine for malaria; Jenner, vaccination for smallpox; Simpson and Morton, general anæsthesia; and Lister, antiseptics in surgery; and to mention a few names from the British medical service I may remind you of the work of Sir Ronald Ross in connexion with the rôle of the mosquito in the propagation of disease; of Sir David Bruce in connexion with Mediterranean fever and the work which he has not yet quite completed upon the sleeping sickness of Central Africa; and not least of all the services of our friend and guest, Sir William Leishman, in connexion with kala-azar and with typhoid inoculation.

The maxim of Sir Astley Cooper still reflects the attitude of the majority of our profession: "Profound erudition is good for a man of means, and practical knowledge for the physician and surgeon."

But to turn from these more civil and collegiate aspects of our subject, I should like to point out to you that the older medical officers still living in the British medical service, or retired from it, began their careers in the Army under auspices far different from those under which our experience began. The first bearer company organized in the British Army was made up from a number of men from the regiments of the Transvaal Field Force during the Sekukuni Campaign of 1879 by Surgeon-Major James Hector, M.D. (Army Medical Department), who commanded the company. The expedition was under the command of General Sir Garnet Wolseley, and Surgeon-Major Hector's account of it may be read in the *JOURNAL OF THE ROYAL ARMY MEDICAL CORPS*, May, 1911. The medical personnel of those days was known as the Army Hospital Corps, some of whom served with this bearer company. In the year 1879, I matriculated at the University of Toronto, and the fact serves to impress vividly upon my mind at least the recency of the final break with the old regimental system of medical service. The second bearer company of the British Army was sent from Britain to South Africa for service during the Transvaal War of 1880 and 1881, under the command of Surgeon-Major William Johnston. Of that first company, Colonel Stanley, then Secretary of State for War, said in the House of Commons that the employment of the bearer company was "a marked feature in field organization," and the



sending two years later from Britain of the first fully equipped and trained bearer company may be truly said to mark an important step in the evolution of the present Army Medical Service, which owes its present organization to the work of the Commission on the Medical Services in the late war in South Africa.

I came too early into the Service to have command of a field ambulance, for the present No. 10 Field Ambulance is the successor of my old command, No. 4 Bearer Company.

To make a long jump backwards in the history of army medical services, I may remind you that practically all medical assistance in early ages was that given to the armies of the ancient races. Homer's two doctors who served with the Greeks before Troy were Machaon and Podaleirius, one of whom, Machaon, is described in the eleventh book of the "*Iliad*" as being in need of medical aid, having been badly wounded himself. The same book described the treatment of the wounded Eurypylus by Patroclus, who cuts an arrow from his thigh with a knife, washes off the black blood, and puts bitter herbs on the wound, which stop the flow of blood.

These allusions were kindly given me again the other day by my former professor and good friend, the Principal of University College, Toronto. He further remarks in characteristic fashion upon the description given, in the same book, of Machaon, when wounded, drinking a "posset" of Pramnian wine with cheese grated into it and barley meal sprinkled over it, which refreshed him, but which Plato criticizes as justifiable for a wounded man only on the theory that if he could stand that he could stand anything and deserved to recover. The drink was given by Nestor's servant and not by a doctor, but the patient who took it was a doctor, and a wounded doctor at that, whence Plato's scoffs.

The Levitical sanitary regulations of the Jews, with regard, for instance, to the control of leprosy, and more particularly the regulations for their armies in the field, are beautiful examples of long clinical experience crystallized into practical form, and if carried out in our own day would go far to maintain the health of armies. Particularly effective are their regulations with regard to the disposal of excreta and the prevention of contagion by means of discharges from wounds or sores. Of course, in these early days, when disease was looked on as an act of God, as something which was to be expected and must be borne, but which was impossible to prevent, there was practically no army medical service. Later on, if a commander were careful, he would engage a leech or barber-surgeon, or a few physicians or apothecaries,

but such provision was entirely on his own initiative. Sick and wounded were handed over to the civic authorities or left in villages to die or get well if they could. Arrangements of this rudimentary sort appear first in European armies early in the eighteenth century. Historians of the campaigns of Marlborough say that in respect of the medical care of his armies he was far in advance of his times.

Most of the great names in medicine and surgery, down to the days of Ambroise Paré, in 1500, are associated with the service of soldiers in the field. About 1600 the barber-surgeon is heard of. He was attached to a regiment and was allowed the privilege of shaving the soldiers. His pay was the not excessive sum of four pence per day.

About 1700 surgeons and assistant surgeons were appointed to regiments and received a commission from the King. They were generally called Mister, and had no rank or position whatever. In the Crimean War, 1854-56, there was nothing beyond the regimental doctor; no adequate hospital organization and no sanitation, so that frightful disasters, due more to sickness than to wounds, befell the army, not through the fault of the medical officers but through the fault of the regulations under which they had to work. General military hospitals of course were improvised, but there were buried in the military burying grounds before Sebastopol, and at Scutari, not less than 22,000 British soldiers who died of disease, not of wounds, and most of it preventible. It is interesting to note that the reformation brought about by the force of public opinion was very much helped, if not mainly initiated, by the efforts of a nursing sister, Florence Nightingale, "the Lady with the Lamp," who died past 90 years of age only about three years ago.

The whole episode of the Crimean War is melancholy reading so far as the medical service, at least, is concerned. Speaking of the circumstances immediately preceding the outbreak of that war, the Crystal Palace had been built, and one might almost say consecrated, to the cause of perpetual peace in 1851. A large share of the British Press and people were singing pæans of peace, as if by invoking the genius of commerce and industry and money-making and self-interest, war had been perpetually banished from this world. One hears of late again, as if it were new, much the same sort of thing from Messrs. Carnegie, Angell and Company. The Duke of Wellington, when he ventured to protest and propose radical army reforms, was met almost by a howl from Press and people, who were demanding why this old dotard, befogged in his



soldiership, should thus seek to shatter their rosy dreams, and his schemes of reform in the Army were delayed almost to the year 1870. Within three years of the opening of the Crystal Palace the Crimean War had begun, and you well know how, in spite of brilliant feats of arms, defective organization and antiquated regulations resulted in hideous suffering and quite unnecessary deaths. In the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for January of this year, beginning at page 88, there is a reprint of a lecture delivered on January 18, 1884, at the Royal United Services Institution by (the then) Surgeon-Major G. H. J. Evatt, A.M.D. I recommend a careful reading of this paper to all of you who have not yet seen it. From this paper I glean the following remarks.

The medical service in the army which embarked for the Crimea in 1854 consisted of a grouping of medical officers, "commissioned by fours, threes or singly to every battalion or battery. These officers wore the regimental uniform, were under the command of the battalion commander, and administered the regimental or battalion hospitals under the control and on the responsibility of the military commander of each unit. In every garrison there were a series of small battalion, regimental, or battery hospitals, each entirely distinct and separate, where the sick of each battery or battalion were treated by their own battery or battalion doctor. The nursing was done by a regimental hospital serjeant and a certain number of privates of each battalion, who were placed by the commanding officer for duty in the wards. The hospital serjeant as the executive agent of the military commander was to maintain discipline in the hospital, and to see that the medical officer's orders were carried out, for the army surgeon himself had no definite power of command, either over serjeant, orderlies, or patients, but referred all questions of the kind to the military commander. If a regimental doctor went sick or went on leave, a staff doctor, of which there were some sixty or seventy in the service, was detailed to take the sick man's place, simply as a locum tenens. For every detail of work in the regimental hospital, the officer commanding the regiment was officially responsible, save and except only medical treatment. The discipline was done by the colonel, orders were issued by the adjutant, the quartermaster had the transport and stores work, and the battalion orderlies did the nursing. There were not in England, in 1854, more than three, if so many, general hospitals. Whatever size the hospitals were, they were purely regimental. The doctors wore the regimental uniform and no authority existed for moving them from their battalions, or



if they were moved no power existed to move the serjeants and nursing orderlies, men quite as important in their way as the doctors themselves."

\* \* \* \*

"Take the ambulance system of this Army of 1854 in the field ; go to the hillside of the Alma on the evening of September 20, 1854, and see how it worked there. The total of regimental army doctors and of regimental orderlies with the army corps that took part in the fight that day was ample, and sufficient, under better organization, to have done well by the comparatively few wounded. There was no attempt at ambulance organization. The battalion surgeons of the regiments under fire, aided by the bandsmen, carried away, or tried to carry away, the battalion wounded. There were no trained regimental bearers, no bearer companies, no field hospitals, no ambulances, no hospital corps, no equipped hospital ships, and behind all was the chaos of Scutari, with its "dreary corridors of pain." I will ask you to put yourself in the place of the battalion surgeon of September, 1854, as he stood that night on the hillside of the Alma, and saw his friends and comrades lying on the ground with none to help them. No ambulances to carry them, no hospital corps to nurse them, the bare 'tween-decks of the empty transport to be their hospital ships and trusting to the sailors of the fleet for the hammocks they used as stretchers to carry them to their ships. I will ask you to think of Thomson, of the 44th Regiment, left on that battlefield with 400 wounded Russians, with no attendant save his soldier servant, and say was it possible for us to stand by so fatal a system."

The result of the state of affairs so trenchantly described was that public opinion, as again after the South African War, demanded a full inquiry into the medical experiences, and in 1857-58, Sydney Herbert's Commission made a few unimportant, not radical, changes which had but little real effect upon war efficiency. "It gave the doctors rank and pay ; it founded the germ of a hospital corps ; it developed a kind of hospital commissariat ; it formed two general hospitals, supposed to be training schools for war work, but it still stood by the fatal error of maintaining the regimental hospital and the regimental doctors in peace." In spite of the incompleteness of this work, however, Lord Herbert's Commission must be recognized as, at least, the commencement and occasion of a great and necessary improvement in organization which followed. The Civil War of the United States from 1861 to 1866, the campaigns of Sadowa in 1867, and the disaster of Sedan and other great battles of the Franco-

Prussian War in 1871, made effective contributions to the desired end. In March, 1873, changes in the British Army Act began, and were followed by further changes in 1876 and 1877, by which important forward steps were taken. The Army Medical Department was formed in 1873 by removing the medical officers, staff and regimental, from the various regiments in which they were commissioned and unifying them into one body. Regimental hospitals were abolished and replaced by central garrison hospitals. The previously scattered groups of nursing orderlies were gathered up into the Army Hospital Corps and the medical officers were made responsible for the management and control of their hospitals, both in peace and in war. In 1877 the command of the hospital corps was given over to the medical officers. Under the war scheme of 1873 organization the regimental stretcher-bearers first appeared, sixteen men trained to ambulance work to assist the surgeon in giving first aid in the field. Sick and wounded are now sent to one of the field hospitals of the division.

A very important step towards efficiency was taken after the first Egyptian campaign under Lord Wolseley in 1882. Prior to this the Corps of Orderlies had been commanded by combatant, not medical officers. These combatant officers became quartermasters in the new organization; the historic origin of the fact that our quartermasters are not medical men. The excellent position in which we now find ourselves in all matters of status, rank, pay, and promotion has slowly and only recently been brought about; for instance, our disciplinary powers for officers, attendants, and patients, such as we have for the Non-commissioned Officers and men of our own units, were granted by Royal Warrant only of August 11, 1877. The captains and lieutenants of Orderlies, the old Corps of Orderlies, became quartermasters from July 1, 1881.

The status of the medical service as regards military boards, so long unsatisfactory, has been finally determined by the appearance of Army Order 209 of 1912, in which all reference to the system under which a medical officer "attended" instead of being a member of a Board finally disappeared from the "King's Regulations."

Before the formation of the Royal Army Medical Corps in Great Britain, upon which our Army Medical Corps is modelled, medical officers were given compound titles, such as surgeon-lieutenant, surgeon-captain, surgeon-major, &c., a system only a few years ago discarded in Canada by G.O. 62, 1899, for A.M.C., and by G.O. 98, 1904, for regimental medical officers. The double title is still

retained in the case of the medical officers of the King's Household troops as a distinctive designation. The story is told of a young subaltern who addressed a surgeon-major as follows: "I do not know how to address you. I do not know whether you should be called major, surgeon-major, mister, or doctor. Which is right?" The reply was: "On parade you will address me as Sir, off parade you will not speak to me at all."

In 1899 I was in camp at Ross in Herefordshire with the fifth battalion of the "Royal Warwicks," and I remember the officers telling me that they liked the old regimental doctor. He was a surgeon lieutenant-colonel, was called "Pa" by the subalterns, and was considered a good judge of wine.

In the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, November, 1911, there is a very interesting biographical sketch of an old inspector-general of military hospitals, Gabriel Rice Redmond. He was an Irishman, born in 1763 in Wexford, and after a brilliant career in Trinity College, Dublin, commenced in 1785 or 1786, obtained his degree of M.D., and was gazetted in 1794 surgeon to the 126th Regiment of Foot. In 1795 he became surgeon to the 28th Foot, now the first battalion of the Gloucestershire Regiment. The regiment was then stationed in Ireland, but shortly after in the same year embarked for Quebec, only to be recalled and sent to the West Indies. One may get some idea of the difficulties of sea transport in those days from Redmond's diary. The transports conveying the troops met with such weather that the headquarters and six companies of the regiment were driven back to England, where they remained till the autumn of 1796, embarking then for Gibraltar. The four companies of the regiment with which Surgeon Redmond had embarked reached the West Indies, and were attached to the 14th Regiment and took part in the capture of St. Lucia, but subsequently joined their headquarters at Gibraltar, and in 1798 formed part of the force which captured Minorca. Four years later, in 1802, Redmond was obliged to return to England on account of ill-health. In 1803 he was given the rank of assistant inspector of hospitals, and served at home in that appointment until 1807, when he accompanied the British force under General Whitelock in the expedition against the Argentine. He appears in reports as inspector of hospitals to the troops in Monte Video in 1807. Returning in 1809 to England he was ordered in 1812 to Quebec, there to report himself to Sir George Prevost, Governor-General of Canada. A few extracts from his diary have much local interest, and cast some light upon the state



of the medical department of the army in Canada just one hundred years ago.

DIARY OF INSPECTOR REDMOND, 1812-13.

"Journal of occurrences from August 27, 1812. This evening I embarked with Phyllis, Anne" (his wife and daughter—ED.) "and a man and maidservant, on board the 'Coleworth,' Victualler, No. 31, . . . Master, at Portsmouth for Quebec, where we arrived after a tedious and stormy passage on October 18. We had nearly been lost in the Gulph of St. Lawrence in a gale of wind in consequence of the wind suddenly taking the ship aback at 12 o'clock at night, and if all hands had not turned out quickly, the ship would have gone to the bottom. The dead-lights were in nearly the whole of the passage."

On October 19 he reported his arrival to Major-General Glasgow, commanding the garrison of Quebec. On October 24 he received orders to proceed at once to Montreal, where Sir George Prevost, the governor-general, then was. The journey of 180 miles had to be travelled by stage coach over very indifferent roads; it occupied two days and was exceedingly uncomfortable. On reporting himself to the Governor-General, he was ordered to proceed to Upper Canada at once to report on the state of the hospitals and medical department. Some of the notes made by Inspector Redmond during his journey are worth reproducing to show the condition of affairs existing at that time.

River Raison: "Here Colonel McMillen commands, and with him 300 of the Glengarry Militia. There was no hospital nor any medicines, and the Colonel complained that his men had not blankets."

Brookville (*sic*) (for Brockville): "There were only sixty men, 1st County Leeds Militia, commanded by Colonel Brackenridge, stationed at Brookville. Mr. Hepill, the surgeon, was in want of every article of medicine, &c., and the sick go to their own homes whenever they like."

At Kingston he embarked on the "Earl Moira," sloop of war, for Niagara; after proceeding ten leagues the ship anchored for the night, and next day the wind being foul, returned to Kingston. He then proceeded by road, but the guide lost his way, and for a considerable time they wandered about in a wood with heavy rain falling all the time. The party finally managed to find an Indian hut in which they passed the night. Next morning they again lost their way in the wood, but managed to secure the services of an Indian boy who showed them the way. At York

he inspected the hospital and found it to be "a miserable one. It was an old condemned house, and could not hold more than twelve patients."

"Mr. Lee (the surgeon) had few medical or purveyor's stores, particularly articles for wounded men."

(November) 14, Fort George, or Niagara: "Inspected the hospitals and barracks again, and went round the quarters of the Militia with Colonel Bishop, Inspecting Field Officer; found them all very much out of repair, dirty, and the windows broken." "Arranged with Colonel Bishop that a steady non-commissioned officer from each Militia Corps was to collect the sick men at 10 o'clock every morning and take them to the staff surgeon."

(November) 15. . . . "The Militia serjeants were not able to collect the sick. Those that gave in their names were gone home, some without leave."

(November) 19: "No possibility of getting to Kingston by sea as the ships were chased by the American squadron beyond the Ducks Islands, and will not venture out of Kingston Roads again, as it is time to lay them up for the winter, and until the frost sets in so that we can travel in sleighs, we must remain at York."

After a prolonged tour, amid much discomfort due to the cold weather, the bad state of the roads, and accommodation available in roadside inns, and further increased by an inflammation of one leg and a fracture of two ribs resulting from a fall, Inspector Redmond arrived back in Montreal on December 2, 1812.

He proceeded by sleigh to Quebec and seems to have had an unpleasant journey to judge by the notes in his diary, of which the following is a fair example: "We had a dreadful day's journey to-day. Our sleigh horse got tired and we did not get to Machiche until late at night. Six upsets to-day. My side at times gave much pain." While in Quebec Inspector Redmond furnished a report on the state of the hospitals in Upper and Lower Canada. He described them all as "miserably bad," and states that the medical and purveyor's stores were very deficient, most of the latter having been in use during the last American war (i.e., the Rebellion). He hired an office and a clerk, and busied himself in making out requisitions and looking over returns. He complains that all the returns furnished by the regimental surgeons were wrongly made out, and that he had to send them all back for correction, a proceeding which must have occupied some time considering the difficulties of communication at that time.

On February 7, 1813, he became very ill with symptoms of



some liver trouble. The attack lasted for three weeks and left him in such a poor state of health that a medical board recommended him to proceed to England as soon as the river opened. During this illness his wife gave birth to a son.

The diary contains many pages full of shrewd observations on the condition of Canada, its people, crops, climate, &c.

Another local touch of interest to us in Toronto is the career of a very famous surgeon in the United States Army, William Beaumont, who was serving as a regimental surgeon at Plattsburg in 1812. His regiment was one of those which took part in the assault upon York when the American forces burned the village, as it then was, and drove out the British troops, who retreated by the Kingston road. You will remember the devastation that was wrought upon the leading forces, when, as the British troops retreated, the magazine of the fort, standing then near the foot of the present Bathurst Street, was blown up, either by accident or design, as the last British troops left it and the Americans swarmed in. Beaumont leaves a graphic account of his thirty-six hours of "cutting and slashing without rest or food," as over 300 of his troops were mangled and maimed. All is fair in war, but he leaves on record some very forceful remarks upon what he considered great inhumanity. It was he who afterwards, in the isolation of a little American army post at Mackinaw, at the mouth of Lake Michigan, conducted upon Alexis St. Martin, the French Canadian voyageur, who died at the age of 83 in the Parish of St. Thomas de Joliette, south of Montreal, so recently as June 24, 1880, the first series of exact scientific observations upon digestion in the stomach, made with a patience and accuracy which amazed and delighted the scientists of France, Germany, Britain, and the whole medical world.

Before closing, and without enlarging upon the different subjects which I suggest, let me remind you of three or four of the main phases of a medical officer's activities. The R.A.M.C. Training lays down, as you all know, four main duties of the medical officer as follows:—

- (1) The maintenance of the Army's health (sanitation).
- (2) The care of the sick and wounded (the work of the physician and surgeon as understood in civil life).
- (3) The evacuation of the sick and wounded (in which a wide military knowledge is necessary, particularly of the duties of the Army Service Corps, Transport).
- (4) Lastly, the replenishment of his own supplies (Army Service

Corps' Supply), to which may be added the military care, discipline, and training of his own rank and file.

To fulfil these varied duties the medical officer must be, not only a good, well-trained soldier, familiar with the duties of the other services in the Army and capable of assuming the same effective military control of those beneath him in the service as is required of any combatant officer, but he must be also, not only a capable physician and surgeon as in civil life, but a trained and capable sanitarian. The problems of the public health officer, which are almost as a sealed book to most of us in civil life, must be to him familiar. Examples of the immense importance of this phase of his work occur at once to all of us. The brilliant success of the United States medical service in connexion with the building of the Panama Canal is familiar in a general way to all of us. This medical service alone made possible the construction of a work in which the French failed with such disastrous loss both of life and money, only forty years ago. We are delighted to have upon our programme for this meeting a paper upon this subject from one of the latest joined officers of the Corps, Lieutenant J. A. Amyot.

One of the most striking instances of what modern sanitation means is shown by a little tin sign which I saw a few months ago on the mantelshelf in the private room of Colonel Melville, R.A.M.C., then Professor of Hygiene in the R.A.M. College in Millbank, London. He had carefully mounted it in a little oak frame. The weather-beaten piece of tin, originally painted black, bearing on it the familiar block letters in white lead, which the Royal Engineers have put up in all quarters of the globe, had been removed and sent to him by a R.A.M.C. officer serving in India, from a door in some old cantonments at Ahmednagar which were being dismantled. It bears the legend: "No. 23, Cookhouse, Lavatory and Privy." Such is the advance of sanitation in the Army Medical Service within the last thirty or forty years.

I close with the remark that we are proud to belong to a British service, and one which is at least the equal in its own sphere of any service or department in that right little Army of that tight little Island which we are determined for all time to come to call still and always our Mother.

# TACTICAL FORMATIONS APPLICABLE TO FIELD AMBULANCE WORK, WITH SOME REMARKS ON MEDICAL FIELD TRAINING.

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## PART I.

### CLOSE ORDER DRILL SUGGESTED AS A SUBSTITUTE FOR COMPANY DRILL, AND FOR THE PRESENT CLOSE ORDER STRETCHER DRILL, AND AS A PRELIMINARY FORMATION FOR FIELD EXERCISES.

At present the Royal Army Medical Corps, with the very limited time which it has at its disposal for war training, is expected to be proficient in three distinct forms of drill, namely, squad drill, company drill, and stretcher drill. Squad drill is of course essential in order to train the personnel in the rudiments and to keep them up to the mark in smartness and general handiness, but it is suggested that company drill *per se* is superfluous from our point of view as it has no bearing on our work in the field, and takes up time which, in the opinion of many, might be more profitably employed otherwise.

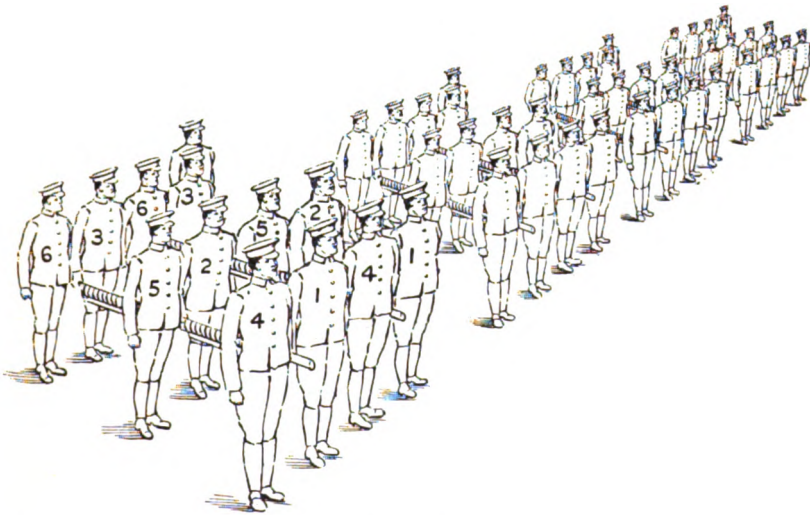
The following close-order drill is suggested as a substitute for company drill as it is applicable not only to the marching about of bodies of men, but also can be used by stretcher bearers in substitution for the present close-order movements in stretcher drill, and is a useful formation for work in the field as a preliminary to extended formations. It is submitted that by its adoption the present elaborate detail for supplying stretchers, wagon drill, etc., might be very much simplified and made more practical.

Many of our officers have commented unfavourably on the delay and elaborate detail necessary before stretcher squads can be put into action; and although in war time much of this would be cut out, it would appear to be advantageous to have a simple system in use in peace time so as to avoid the necessity of hurriedly improvising a practical drill on the spur of the moment.

At present two distinct systems of drill are employed in our corps for work in the field: company and squad drill for marching the personnel when not carrying stretchers, and close-order stretcher drill for manœuvring it when once stretchers have been "supplied." Even in the close-order stretcher drill there appear to be unnecessary complications; for instance, the disposition of bearers round

the stretcher varies according to whether the squads are in close order or in the so-called extended formation. (See "Royal Army Medical Corps Training.")<sup>1</sup>

The close-order drill described below can be used with or without stretchers, and so renders these complications unnecessary. The formation is more compact than that used at present when carrying stretchers in close order, and is much more flexible. It is simple to learn, and the necessary words of command are few. This drill has been used unofficially for some time past at the Depot, as a matter of convenience when doing field work.



Rank and file of a section of a field ambulance on parade in suggested close order drill (stretchers have been supplied in this case). [Six squads and tent subdivision (on left).]

The general system is to group the men into bodies called "sub-sections," which consist of 12, 10, or 8 men each, the equivalent of two stretcher squads of 6, 5, or 4 bearers each. It will be noticed that the sub-section has a front of four men, and by wheeling it in various directions any number of sub-sections with or without stretchers can be manœuvred on the general

<sup>1</sup> In the present stretcher drill the Nos. 4, 5, and 6 are behind the stretcher when in close order and on the right of it when in "extended" order. The latter formation has been adopted in the suggested drill for the close order, as it is more compact and convenient in every way, and does away with the tail of men behind the stretcher which hinders manœuvring.



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principle of company drill, and can be readily deployed for extended movements at a moment's notice.

Different branches of the Service have different types of drill bearing on the work they have to do ; for instance cavalry foot drill is quite different to that employed by infantry and it is therefore suggested that this close-order drill might be called " Royal Army Medical Corps Drill."

For drill purposes the whole formation will be known as a " section." The men will be sized and told off into squads of 4, 5 or 6 men each as at present. The squads will then be numbered from right to left as at present laid down.<sup>1</sup>

They will then be in the formation shown in sketch, fig. 1.

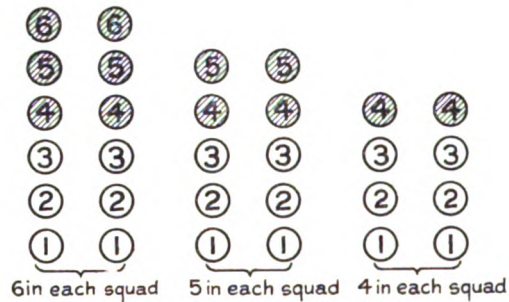


FIG. 1.—Size—Form Company—By sixes (5's or 4's) number, &c., &c., as in the present stretcher drill.

Words of command	Detail	Diagram
"Section, form —up."	Nos. 4, 5, and 6 take a side pace to the right and then march forward, aligning themselves with the Nos. 1, 2, and 3 respectively. (See fig. 2.)	
"Nos. 2, 4, 6, &c., squads."	The Nos. 1 of the squads named hold up the left hand, as in company drill.	

FIG. 2.—Section, form—up.

<sup>1</sup> On service or field training the men (whether belonging to the bearer or tent sub-division) would always be in the same squads and the Nos. 4 always the same men, so that on being ordered to fall in they would at once assume the formation shown under fig. 3.



Words of command	Detail	Diagram
"Left of—sub-sections."	The Nos. 1 of each squad named cut the hands away. (The section is thus told off into a number of "sub-sections," each consisting of 12, 10, or 8 men, the equivalent of two stretcher squads of 6, 5, or 4 men each.)	
"By the right," or "Right—dress" in ceremonial.	The sub-sections dress by the right, the squads with even numbers ( <i>see above</i> ), dressing up close to their right squads, an interval of two paces being kept between the sub-sections. This allows free manoeuvring, the three ranks keeping at a distance of one and a half paces from each other. ( <i>See fig. 3.</i> )	

FIG. 3.—"By the right."

The following formations can be taken up: (a) Line, (b) Column. (*See figs. 4 and 5.*)

Sketch of a subsection = for subsequent diagrams

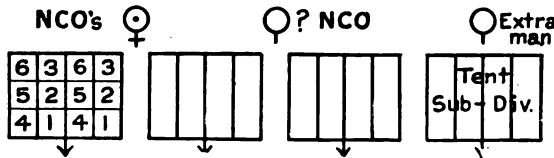


FIG. 4.—Section in line.

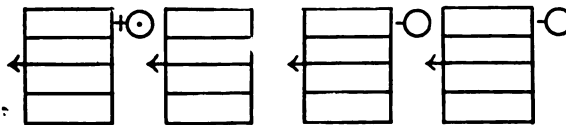


FIG. 5.—Section in column by the right.

The sub-section is treated as a squad in fours, and can be "wheeled" in any direction. (The wheel should not be carried out as a form, otherwise distance is lost.) By wheeling or

inclining the sub-sections any formation can be quickly taken up on the following principles analogous to company drill.

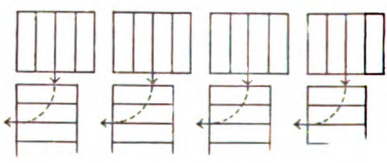
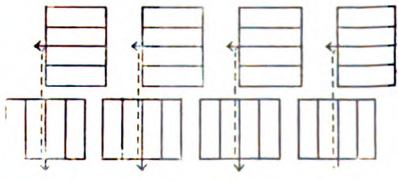
Words of command	Detail	Diagram
<i>Moving forward when in line.</i> "Section, by the right (or left), quick—march."	As in squad drill.	
<i>Changing direction when in line.</i> "Section, right (or left)—form."	At the halt or on the move, as in squad drill.	
<i>When in line forming column to a flank.</i> "Sub-sections, right (or left)—wheel."	Each sub-section wheels to the flank named, and they then move off one behind the other, maintaining a distance of two paces between the sub-sections. (See fig. 6.)	
<i>When in line forming column in the same direction.</i> "Right (or left) sub-section to the front, remainder right (or left)—wheel."	As in company drill, at the halt or on the move.	
<i>When in column of route forming line in the same direction.</i> "(At the halt) On the right (or left) form—line."	If on the move, the leading sub-section marks time, the remainder make an incline and form up on the flank named, marking time until the word "Forward" is given. If the caution "At the halt" is given, the leading sub-section halts and the remainder halt when in alignment.	
<i>When in column of route forming line to a flank.</i> "Sub-sections, left (or right)—wheel."	The sub-sections wheel on their own ground, thus forming line, and move on when in alignment. (See fig. 7.)	

FIG. 6.—"Sub-sections, right—wheel."  
From line to column to a flank.

FIG. 7.—"Sub-sections, left—wh"  
From column to line.

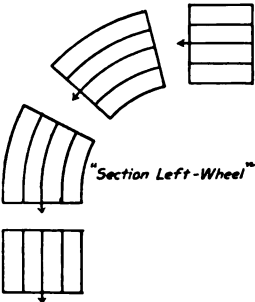


Words of command	Detail	Diagram
<p><i>Wheeling when in column of route. "Section, left (or right)—wheel."</i></p> <p><i>Narrowing the frontage when in column. "Form single—file."</i></p> <p><i>To reassume column from single file. "Form—sub-sections."</i></p>	<p>The sub-sections wheel in succession following on one behind the other, as a squad in column of fours in squad drill. (See fig. 8.)</p> <p>The squad on the right of each sub-section leads on, the left squads step short and fall in behind their right squads. (See fig. 9.)</p> <p>The left squads double up to their positions on the left of their right squads, the whole stepping short to allow those in rear to close up to the proper distance. (See fig. 10.)</p>	 <p>"Section Left-Wheel"</p>
<p><i>Supplying stretchers. The section is halted in line or column. "Supply—stretchers."</i></p>	<p>The Nos. 3 of each squad turn about and double out to the stretchers, and supply them <i>independently</i> to their respective squads, holding and grounding the stretcher as laid down in "Royal Army Medical Corps Training," but in their own time.</p> <p>As soon as the stretchers are supplied the squads "stand to stretchers" without further word of command.</p>	
<p><i>"Lift—stretchers"</i></p> <p><i>"Lower—stretchers."</i></p>	<p>As at present.</p>	

FIG. 8.—Wheeling when in column.

FIG. 9.—"Form single—file."

FIG. 10.—"Form—sub-sections." Narrowing the frontage to pass an obstacle and re-forming sub-sections.

In turning about when carrying stretchers in close order the men carrying the stretcher will always turn towards the stretcher, and when "retiring" in close order (which will only be done for very short distances) they will carry the stretcher in the left hand. When advancing after retiring, therefore, the Nos. 1 and 3 will turn left-about and change the stretcher into the right hand again. This modification in detail is necessary, as otherwise the Nos. 4, 5, and 6 are pushed to one side by the stretcher, and the formation is disturbed.

Words of command	Detail	Diagram
"Transfer—stretchers."	In order to rest the Nos. 1 and 3 when on the march, they may hand their stretchers over to the Nos. 4 and 6 into their left hands (for drill purposes), and then re-transfer them on the command "As you were."	

When on the march the bearers could do this on their own account without pausing. All the bearers in a squad are interchangeable (except the Nos. 4), and they *should* frequently be changed to avoid tiring Nos. 1 and 3.

## PART II.

### EXTENDED FORMATIONS AND FIELD TRAINING.

OF late years much attention has been given to the training of the Royal Army Medical Corps for war. Medical manœuvres, occasional field days, and lectures provide opportunities of improving our knowledge of that important subject, medical tactics.

We hear much of the rôle of a field ambulance and the duties of its commanding officer, the duties of the A.D.M.S. with troops in the field, &c., but of the duties of the junior officers, N.C.Os., and men of the field ambulance we hear very little except in a general way. The practice thereof is limited to about fourteen days a year, some of which valuable time is taken up by preliminary training, which might well have been mastered during the winter months even with the small number of drills which the average hospital company can carry out.

There is little doubt that the majority of our junior officers and N.C.Os. are quite unable to handle men in the tactical formation necessary to the modern battlefield, and our deficiencies in this respect were very clearly shown at the Medical Manœuvres in 1912 and at the various camps of instruction, when, entirely owing to want of practice in field work, many glaring mistakes were made. Stretcher-bearers advanced under fire in close formations; stood grouped round the "wounded" men on the sky-line; lost their way,



as no landmarks had been pointed out as guides; and in several cases became bogged owing to want of knowledge of ground and faulty handling by the junior officers and N.C.Os. Preliminary reconnaissance was unknown. Control was lost early in most cases, and those officers who maintained it were forced to adopt close formations in order to do so, thus exposing their men to "loss," and leaving areas of ground on their flanks unsearched, which had subsequently to be cleared up.

It is probable that under the conditions of modern war little can be done in the way of *collecting* wounded while an action is in progress in the vicinity; the majority of badly wounded men will lie where they fall, and may be scattered far and wide over the line of advance of their units; comparatively few will be able to reach the regimental aid posts. Stretchers cannot be taken into the firing line and first aid will have to be carried out by the wounded man's neighbour, or by the cautious advance of the regimental stretcher-bearers attached to companies, who, after having given first aid in the prone position, can only hope to drag the wounded man to the nearest cover and there leave him, marking the spot by tying a bandage on the nearest tree or sticking the man's rifle, with bayonet fixed, into the ground. Many of the wounded men will not receive first aid at all, as, owing to their small numbers, the scope of the regimental bearers is very limited. In these circumstances the problem that faces the bearer division of a field ambulance is not only to take over the wounded from the aid posts, but also to search systematically the ground over which the infantry has advanced, administering first aid, where not already given, and collecting the wounded into groups for subsequent removal on the return journey. This will usually be done late in the action, but under certain conditions it may be necessary for the bearer division to advance under artillery fire and long-range unaimed rifle fire during an action<sup>1</sup> so as to clear a position vacated by the infantry in their advance, and in savage warfare they may have to advance right up to the firing line, maintaining very close touch with the regimental bearers, and thus coming under effective rifle fire (*see* account of the Battle of Omdurman).

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<sup>1</sup> Unaimed rifle fire is fire directed by the enemy against an object, but being aimed too high, passes over that object and searches the ground for a couple of thousand yards to the rear, and takes effect on the troops whose presence is probably unknown to the enemy. The maximum range of shrapnel varies from 6,200 yards when fired from the 13-pounder horse artillery guns to 9,500 yards with the 60-pounder garrison artillery heavy-battery gun.



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This may of course be necessary when time is an object and there are only a few casualties to evacuate by stretchers at once, and might also be the case early in an action when the bearers could not advance far from their advanced dressing station.

In many situations when clearing ground and searching for wounded, the field ambulance bearers will have to advance over a wide front and in a widely extended formation, both to avoid loss to themselves, and in order to search systematically the area of ground allotted to them. For this work there is no adequate formation laid down, the regulation "extension" of stretcher squads to a few paces being useless and often dangerous.

Officers commanding field ambulance camps of instruction have on their own initiative adopted wider extensions than those laid down; but there is a lack of system in the training of the corps as a whole in this respect, and the fact that the majority of our N.C.Os. and men are quite ignorant of the system of control by whistle, signal, and the passage of orders from man to man militates very seriously against their being adopted with much success under present conditions, as the stretcher-bearers lose direction and much confusion and loss of time results. It appears necessary for some definite extended formation to be laid down as a basis, and regularly practised during the year, thus saving time at practice camp and preventing the recurrence of the errors so constantly seen on manœuvres.

The first thing necessary is the instruction of N.C.Os. and men in the system of control by whistle and signal, as laid down in the chapter on section drill in "Infantry Training," coupled with the practice of extended formations and the passage of orders from man to man as adapted to the requirements of stretcher-bearers. First of all as a drill on the parade ground with moderate extensions and later with full extensions over actual country with sham casualties.

The necessary signals can be easily learnt in a few minutes, though the correct carrying out of extended formations requires a certain amount of practice. All N.C.Os. should be provided with whistles and practised in making the signals clearly and correctly.

The following elastic formations, which we may call Formation "A" and Formation "B," have been tried at our depot and at the Aldershot Camp of Instruction, and appear to answer their purpose. They are applicable not only to a section or the entire bearer division of a field ambulance, but also to individual squads when acting independently. The formations, based on Infantry

Training, are simple to teach and easily carried out by the men, who look upon this training as an agreeable change to the ordinary routine of barrack-square drill.

Before beginning practice it must be impressed on the men that it is the duty of all to pass signals and orders down the line, and if this is not done, orders are liable to miscarry and confusion results. In some cases it may be necessary to detail one or two men of each squad to keep touch by watching for signals and orders, and to pass them along to the squads on their right and left when other members of their squad are doing first aid.<sup>1</sup> It may not always be possible to use the whistle to call attention, and even if used it will not be heard along the whole length of a widely extended line. In wide extensions orders would have to be passed down by everyone, and it must be borne in mind that whistles must not be used when near a firing line.

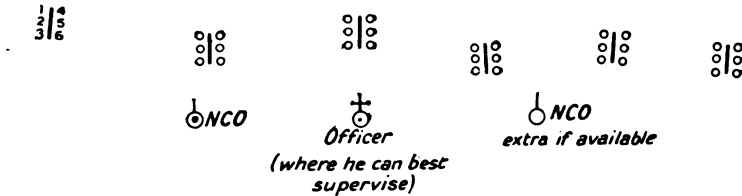


FIG. 11.—Bearer sub-division in Formation "A" (diagrammatic). Squads extended from 10 to 100 paces.

*Formation "A"* (fig. 11).—Squads in extended order at an interval of from 10 to 100 paces between squads. This formation is suitable for the following conditions, the amount of extension being varied according to the ground and general requirements of the situation :—

(1) As a preliminary extension when going into action. Commence with a 10-pace interval and gradually extend to 100 if necessary. (2) When searching very open ground. (3) When under desultory artillery fire or long-range unaimed rifle fire. (The lateral spread of shrapnel being about 25 yards, a closer formation than squads at 30 paces' interval should never be adopted when under fire). (4) Men should be trained to recognize short distances,

<sup>1</sup> In the Japanese bearer battalions nearly half the personnel is detailed for this purpose, showing the importance which they attach to inter-communication and control.

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such as 100 paces, 50, 25, and so on, by means of fatigue men placed at these distances apart.

By means of the whistle and signal control coupled with the prompt passage of orders from man to man one man can easily direct three or four trained squads at a maximum interval of 100 paces between squads. If a second N.C.O. were available to work with the bearer sub-division, control could be still better carried out.<sup>1</sup>

The sub-division should be looked upon as the tactical unit of the bearer division, just as a company is the tactical unit of a battalion.

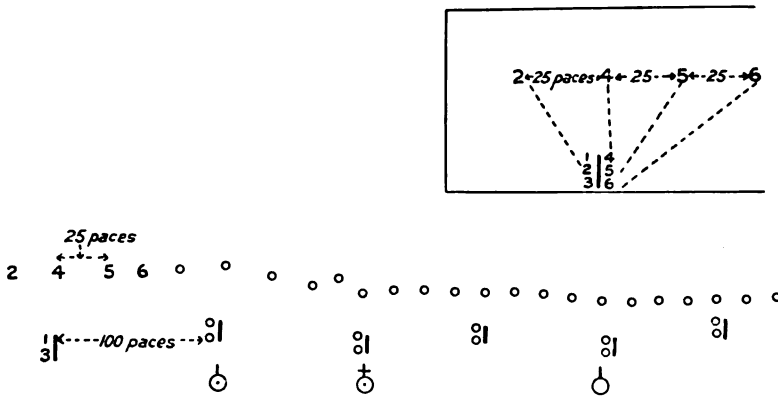


FIG. 12.—Bearer sub-division in Formation "B." Inset shows method of changing from Formation "A" to "B" or vice versa (the primary extension between squares being in this instance 100 paces).

*Formation "B"* (fig. 12).—This formation is a secondary extension from Formation "A," and is suitable for the following conditions: (1) When searching very broken country, woods, gorse commons, or very long grass, such as is met with in the Tropics. (2) When under effective fire. (3) When operating in the dark. (4) In any circumstances where very close inter-communication is necessary.

To order Formation "B" from Formation "A" a special signal is necessary, and I suggest the following: Arms stretched out in front of the body horizontally, palms together and then swung horizontally backwards and outwards until in line with the shoulders, as when taking the breast stroke in swimming. When

<sup>1</sup> These N.C.Os. might be taken from the tent division.

signals could not be used the order "Second formation" should be passed along. On the signal being reversed—i.e., starting with the arms in line with the shoulders and then bringing the palms together in front—the squads would resume Formation "A."

On the signal for Formation "B" being given (supposing that the sub-division is in Formation "A" with an interval of 100 paces between the squads), the Nos. 4 will double out 30 paces or so to their front, the Nos. 2 will double out half-left and the Nos. 5 and 6 half-right, aligning themselves with their Nos. 4, and at 25 and 50 paces from him respectively. The Nos. 1 and 3 carrying the stretcher must be careful to keep 30 paces straight behind their No. 4, who controls the squad, and whose position is thus readily indicated to all. The men carrying the stretcher, being in the rear of the supernumerary bearers (Nos. 2, 4, 5, and 6) in this formation, can more easily watch them and advance diagonally to their aid on being called upon by their Nos. 4.

(Note.—If the original extension in Formation "A" was only to 50 paces, the interval between the supernumerary bearers in Formation "B" would be 12 paces (i.e., a quarter the original interval between squads) and the Nos. 4 would only need to double out about 15 paces.

When practising these movements, care must be taken to impress on the men the importance of keeping correct direction, interval, and lateral touch; this must be insisted on from the start, but there is no need to keep a straight line, in fact a wavy or irregular front (*provided that lateral touch is not lost*) is preferable, as it is not so conspicuous to a possible enemy, and once casualties are found it would be out of the question to keep a line of any sort. The pace should be a steady one, about a mile and a half an hour, as some of the squads may have to cross difficult ground and would otherwise be left behind, and lateral communication might be interrupted. Men should be trained to lie down whenever halted, unless searching for wounded, and parade movements should be eliminated as far as possible, as soon as the principles have been mastered (Infantry Training). The men should be trained to close in automatically to bridge a gap in the line caused by a squad falling out.

For drill purposes, when retiring in Formation "B" either as a sub-division or by single squads, the Nos. 1 and 3 carrying the stretcher should swing round and step short, to allow the supernumeraries to pass back between them and advance again when the line of supernumeraries is the correct distance to their front.

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So that in whatever direction the squad is moving the line of supernumeraries is always in front of their stretcher and No. 4 directly in front.

When retiring squads are ordered to re-assume Formation "A" or to close up completely, the supernumeraries will fall in on the stretchers in their proper order, i.e., Nos. 1, 2, 3 on the right of the stretcher, and Nos. 4, 5, and 6 on the left.

If the only available ground is limited in size the full extensions as laid down need not be carried out; the same object can be obtained in a measure with squads in Formation "A" extended to 10 paces only, and the supernumeraries in Formation "B" at a corresponding interval of 2 to 3 paces. In this way ten or twelve stretcher squads could learn the *rudiments* on an average-sized battalion parade-ground, which is always available.

When the men are proficient in carrying out these movements as a drill, extending and closing, and passing whispered orders rapidly, keeping their interval and direction accurately, the next step is to apply the above formations to actual work in the field, adopting wide extensions and constantly practising the passage of orders. Pains must be taken to develop the initiative and self-reliance among the senior privates, as in war time all regular Royal Army Medical Corps privates may have to act as Nos. 4 and take control of their squads, each squad being a semi-independent unit.

It should be impressed upon the men that when they are actually in the field they are there to collect and give first aid to the wounded, and that the formations practised are only intended to facilitate general control and must not be blindly adhered to under all conditions.

The fact that squads are halted should not prevent men looking round for casualties in their immediate neighbourhood; they should, however, keep in touch with their Nos. 4. The same applies to bearers not actually engaged in dressing a case.

It is recognized that in field work over difficult country, when the bearer sub-division begins to meet casualties, the formation is certain to become broken up; at times the squads may be scattered about attending to cases under their Nos. 4, and lateral communication may become interrupted temporarily. In these circumstances the Nos. 4 should make every effort to re-establish touch by putting out look-out men, and in order to facilitate general control it would probably be best to divide the area to be searched into zones parallel with the front, the limit of which should, if possible,



be pointed out beforehand, the squads being ordered to halt when reaching the limits of a zone, so as to allow those lagging behind to catch up. When all the squads have reformed a second zone may be searched, and so on until the limits of the sub-division area is reached.

The men should also receive elementary training in: (a) The military vocabulary; the recognized methods of describing a landscape by the "clock and finger method"<sup>1</sup>; the use of landmarks and subsidiary landmarks as a means of keeping a true direction across country. (b) Practical training in the use of cover, keeping correct intervals, direction and inter-communication over broken and difficult country, and in the method of crossing exposed sky-lines, the use of dead ground and the surmounting of obstacles.

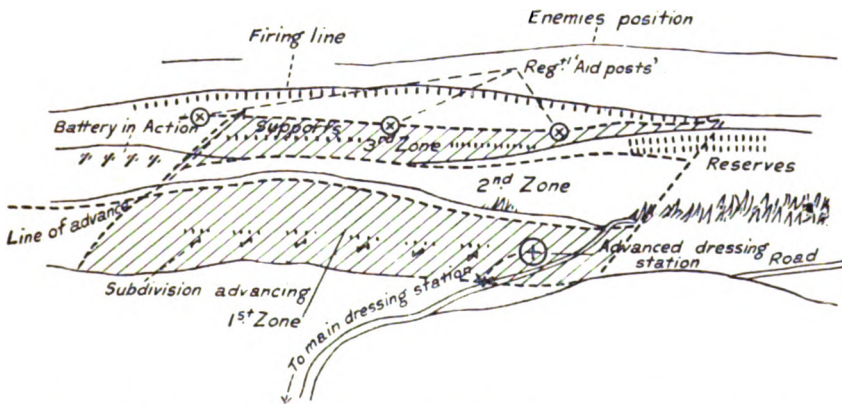


FIG. 13.—Diagram showing system of dividing the area to be searched into zones. The sub-division is halted under cover at end of each zone to allow squads which have fallen out to do first aid to rejoin. When all have rejoined, the sub-division searches the next zone and so on.

If it is not possible to exercise the men over actual country, much can be done on a barrack-square by encouraging the men to use their imagination and by the employment of artificial or imaginary obstacles, &c.

The Nos. 4 may be trained on the square to use their own initiative when working in the field and dealing with casualties, real or imaginary, on the following lines:—

A short lecture should first be given, the following points being

<sup>1</sup> Used by the infantry for directing advances or concentrating fire on particular points.

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brought out: When working in the field and dealing with casualties the No. 4 is responsible for the conduct of his own squad, and he may when necessary, while acting in accordance with the general idea, vary its formation in accordance with the local situation. For instance, supposing the sub-division to be advancing in Formation "A" and the No. 4 finds that his line of advance leads through a small wood, he may order his own squad to assume Formation "B" so as thoroughly to search the wood, and then reassume Formation "A" when clear.

When the No. 4 is in charge of a squad advancing as part of a bearer sub-division he should handle his squad on the following lines: The bearer finding a casualty will call up the No. 4, who will take over the case and treat it with his Nos. 1 and 3, thus setting free all the supernumerary bearers to search round in the neighbourhood for other wounded, dressing slight cases themselves, and informing the No. 4 of the position of serious ones. The supernumeraries should also keep a watch on the other squads so as to be able to inform the No. 4 of their position and the direction in which they are moving. If the case to which the No. 4 is called happens to be trivial he can leave Nos. 1 and 3 to dress it and help his other bearers.

The bearers should at all times keep in touch with their No. 4 and watch for his signals. This would prevent a group of six men all attending to one case while casualties in the neighbourhood are left unattended. More than three bearers would never be required to dress a case, and if only two were necessary the third should join the supernumeraries in quartering the ground close at hand. When all casualties in the neighbourhood of the squad are dressed the No. 4 will give the order or signal to advance again, according to circumstances.

Interest may be stimulated and the instructions outlined above emphasized by means of a series of little schemes as follows:—

Stand the squads easy and detail one or more casualties occurring under various conditions, such as are suggested in the appended scheme of training (q.v.); fall out one of the squads and make it extend from some distance off and approach the wounded man; No 4 will control his squad and act according to circumstances, and the remaining squads will watch and be ready with their criticisms. When the manoeuvre has been completed, ask for criticism from the onlookers, criticize the practice yourself, and ask the No. 4 his reasons for anything he has done. Make the squad repeat the operation correctly. In this way work through as many squads

as possible, giving each a casualty to deal with under various situations.

When criticizing emphasize important points, such as: (a) Always to get a wounded man under cover, if necessary, before dressing him, temporarily stopping hæmorrhage by the finger; (b) only the number of men actually necessary for dressing the case should approach the wounded man, the supernumeraries, if halted by the No. 4, lying down under cover some little way off until required, or, if necessary, looking about for other casualties, dressing them and reporting positions to No. 4; (c) never bunch round a wounded man if under fire; (d) unnecessary running about and shouting should be avoided as it attracts attention and draws fire; (e) if under fire and no cover is available the dresser will have to give first aid in the prone position and only the minimum number of men should approach. A casualty under heavy fire with no cover near should only be approached by one man, who will only attempt to stop hæmorrhage, and so on. In order to impress on men the importance of these rules I have found it useful when carrying out this practice "under fire" to make casualties of all bearers who expose themselves unnecessarily. The sight of a dozen or so bearers lying round the one casualty they came to succour impresses itself on the men and makes them remember.

These individual squad practices are only intended to develop initiative on the part of the men, especially the Nos. 4, and they must modify the directions to suit particular cases. As a general rule, when searching ground, it is best only to dress the cases and mark their positions on the outward journey, as otherwise the whole sub-division may be employed carrying wounded back before first aid has been given to others in more distant parts of the area. On the return journey to the wagons the cases already dressed should be carried back, or the wagons, if possible, brought up nearer.

By systematic practice on the above lines, even when carried out on the barrack-square (coupled, of course, with first aid instruction and necessary drill), it is submitted that the men would go to practice camp with a good general idea of the theory of field work, and would then be able to apply their knowledge to actual work over country by means of schemes more ambitious and instructive than are possible at present when so much time has to be spent in elementary instruction and the rudiments of drill.

The instruction of the junior commissioned ranks might also be systematized on the same lines, so that an officer who has probably spent most of his time in technical work might have a

cut-and-dried system to work on when suddenly called upon to take command of a sub-division of field ambulance bearers on manœuvres or in war. Only general principles are laid down in the "Training Manual." Particular attention should be paid to preliminary reconnaissance, methods of intercommunication, and the necessity emphasized of explaining the situation to Nos. 4 and N.C.Os. before deploying, and directing the advance by pointing out landmarks clearly, coupled with the use of the map.

Much might be learnt by watching the infantry during battalion and brigade training. With his N.C.Os. and men trained properly in field work it is certain that the task before a commander would be easier than it often proves under present conditions.

#### SCHEME OF FIELD TRAINING.

(1) Practice in whistle and signal control, commencing in close order; halting, advancing, changing direction, retiring, lying down, &c., until the signals are thoroughly learnt by all.

(2) Formations "A" and "B" at moderate intervals, changing from one formation to the other, extending, closing, changing direction.

(3) The squads to stand easy and lower stretchers on the signal to "Halt."

(4) Practising correct direction and interval, filling a gap when a squad falls out.

(5) Practising formations without the whistle, orders to be given in a low tone to the nearest squad, and passed down by signal or word of mouth from man to man.

(6) Practice of initiative by Nos. 4, altering the formation of their own squads as follows, but keeping in touch with other squads on flanks: (a) From Formation "A" to Formation "B" to search a patch of wood or broken ground; (b) From Formation "B" to Formation "A" to cross a bridge or gap. All the above can be carried out on a parade ground, provided that moderate extensions are used.

*Hints to be noted when Collecting Wounded under Fire.*—

(a) Get the case under cover before dressing. (b) Only the bearers actually necessary to dress a case must approach; the remainder of the squad, if halted, lying down under cover. (c) The stretcher not to be brought up till the case is ready for carriage. (d) Those men of the squad who are not halted to continue to advance, keeping touch with the squads on their flanks. (e) First aid to be given in the

prone position, if no cover is near; never bunch round a patient when under fire. (f) Reserve the stretcher for serious cases, making use of hand-seats if distance is short. (g) Shouting and running about to be avoided, as it is likely to draw fire. (h) The No. 4 must only halt the minimum number of bearers he requires for first aid and carriage, the remainder of the squad continuing their advance. (i) Do not cross a sky-line unless absolutely necessary; if it must be done, do it at the double. Choose a place with bushes in preference to a bare ridge.

*Practical Demonstration. Individual Squad Practice in Collecting Wounded.*—First of all explain that wounded men come under four groups: (1) Cases able to get back alone after being dressed. (2) Cases able to get back with assistance of one or two bearers. (3) Cases requiring stretcher carriage, the distance to the wagons being long or short. (4) Cases so severely injured that they must not be moved without consulting a medical officer.

*Note.*—If it is not possible to get in all the cases, the more severe should be left.

*Practical Exercises.*—Stand the squads easy and fall out one squad at a time, and make them collect the wounded men in Formation "B," No. 4 controlling under different conditions, each scheme bringing out one or two points, the remaining squads to watch carefully. When each squad completes its practice, ask for criticisms from the onlookers, make your own, and get the No. 4 to explain the action he has taken. Make the squads repeat the practice correctly.

*Note.*—The above can also be practised on a parade ground.

All the above practices should be carried out in Formation "B" or Formation "A," as applicable to the situation, it being borne in mind that at long ranges Formation "A" is less visible. If under rifle fire, unless at very long ranges, Formation "B" should always be used.

*Practices.*—(a) The squad to be considered part of an advancing sub-division. The Nos. 4, helped by Nos. 1 and 3, dress the case and leave it under cover, the remaining bearers meanwhile quartering the neighbourhood and looking for other wounded, dressing slight cases, and calling the attention of Nos. 4 to severe ones; they should also keep in touch with neighbouring squads and with their Nos. 4. Explain that this is the usual procedure.

(b) The following are based on the supposition that it is necessary to take the patient back at once, and are only intended as rough guides in setting the practices:—



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In each case the squad will proceed as follows: The bearer who finds a wounded man will call up his No. 4, who rapidly decides under which of the above four groups the case comes. The two then drag the case under cover, if necessary.

(1) The case is one which is able to walk back, the No. 4 (with the help of Nos. 1 and 3) dresses the case and sends him to the rear, falling out a bearer or two, if advisable, to accompany him. The remainder of the squad having received no orders, continue to advance, being rejoined by the No. 4 as soon as possible.

(2) The case requires stretcher carriage, the distance to the wagons being over a quarter-mile or so. The bearer finding the case signals to No. 4, who decides as above and halts his whole squad. No. 4 (with the help of Nos. 1 and 3 if necessary) gets the case under cover and dresses it. When the case is ready for removal, and not before, the Nos. 1 and 3 remove the patient. The whole squad then retires in Formation "B" (modified if necessary), the "supernumeraries" being adequately extended, but ready to assist with the stretcher.

(3) The case is as in No. 2, but the wagons a short distance away. The case is taken into cover and dressed. Nos. 1 and 3 only are halted; the remainder of the squad continues to advance. Nos. 1 and 3 help the No. 4 to dress the patient, and then take the case to the rear, the No. 4 rejoining his squad.

(4) The case is too severely wounded for carriage: (a) If No. 4 is in doubt, he will send for the medical officer, leaving sufficient bearers to carry the case back if necessary. (b) If he has no doubt that the case should be left, he will fall out only sufficient bearers to dress it, leaving one man if necessary to watch. He will make a note of the position of the case and continue his advance.

(5) Practice in removing wounded from a ridge or other exposed position, it being known that the bearer sub-division will not be required to cross the ridge. No. 4 halts his squad in the nearest cover, and then advances cautiously with one or two bearers, doubles up to the wounded man, and drags him into cover.

(Note.—This can be made a collective practice with two or more squads, the ridge being imaginary if necessary. If a fire-swept ridge lies in the line of advance of the bearers, it is best to halt the whole sub-division close up under cover, a few men then reconnoitre the position to see if any wounded are there; if there are wounded, the squads act as detailed above. If the squads are then required they should skirt the ridge, rather than walk over the top of it.)

*Lectures and Demonstrations.*—To be given to officers and men on the following subjects:—

Visual Training. Indication and recognition of targets. Judging distance up to 400 yards.

Use of Cover.—Cover from fire; cover from view; when latter is dangerous; method of crossing ridges or exposed ground; use of ground during advance; dead ground; meaning of terms employed in describing a landscape. Clock and finger method. Use of landmarks and subsidiary landmarks, &c. Methods of keeping direction across country, &c.

Responsibility of No. 4.—No. 4 is responsible for his squad, he may modify their formation as noted above, and is responsible for keeping lateral communication and direction, and for collection and dressing of wounded under varying conditions.

Remarks on method of conducting field work.—Steady pace; accurate direction and interval; prompt repetition of orders; drill movements eliminated as far as possible; men if halted to lie down automatically and to look to their No. 4 for further orders. If possible individual bearers to search ground near at hand when halted, but not to lose touch with No. 4.

*Note.*—The subject matters suggested may be found in the following text-books: “Royal Army Medical Corps Training”; “Field Service Regulations,” Parts I and II; “Infantry Training”; “Musketry Regulations.”

Practice over easy and difficult country with maximum extension in accordance with a scheme prepared beforehand. Casualties should always be used. The practice should be carried out at the usual annual camp of instruction.

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## NOTES ON HOMEWARD-BOUND TROOPING.

BY MAJOR F. E. GUNTER.

*Royal Army Medical Corps.*

STIMULATED by Major J. B. Anderson's useful article on trooping, and having had the good fortune to have been twice in medical charge of a homeward-bound transport from India during the past twelve months, I have jotted down the following notes in the hope that they may be of service to officers placed for the first time in medical charge of a transport bound for England. I have included a few general suggestions regarding trooping which, if followed, would, I think, increase the efficiency of the service.

In the embarkation orders one is told to report oneself to the assistant director of medical services at the port of embarkation three clear days before the date of sailing, to assist in the embarkation arrangements. As these are fully provided for by the embarkation staff the length of detention of the senior medical officer at the port appears to be needlessly long. If he arrived the day before, it would be ample time for anything that he might be required to do. The extra days in Bombay or Karachi put him to considerable expense, for which no compensation in the way of detention allowance is granted. On going on board, the arrival report book in the ship's orderly room must be signed. Having done this and reported in person to the officer commanding, one should proceed to the hospital, take over the confidential documents and assign duties to the personnel of the Corps.

The permanent medical establishment of Indian transports consists of one serjeant, one corporal, two orderlies of the nursing section and one of the general duty section. It will be found convenient to assign definite duties to all of these: for example, the clerking, dispensing, and medical out-patients to the serjeant, the women's hospital to the corporal, the men's hospital to one nursing orderly, the surgical out-patients to the other, and general duties to the general duty orderly. What duties are assigned to each must vary with the qualifications of the men. For instance, if the corporal is a passed dispenser he can take on compounding; one of the orderlies may be a good clerk, in which case he can relieve the serjeant of a good deal of work, and so on. It is well to apply to the adjutant for a bātmān. There are always men available for this purpose, and a bātmān is very useful for taking messages and assisting the

general duty orderly. It should be explained to the man that the appointment carries no extra duty pay with it. With reference to the general duty orderly, I would suggest that men of some experience in nursing duties be chosen for transport work. In the event of extra pressure of sickness it is important to be able to rely on the general duty orderly for nursing.

Having distributed the subordinate personnel, the officers should be told off to their various duties. It is well to collect them together so as to get an idea of what they are good at, for example, if an officer has recently held the appointment of staff surgeon he is obviously more suitable for looking after officers and their families, or women and children, than one who has spent all his time in a station hospital. On my last voyage I had under me one major and three captains. To the major I gave the hospital, medical out-patients, insanes, and isolation hospital ; to one captain, officers and their families ; to a second, women and children ; and to the third the surgical out-patient department and to assist in the hospital if required.

*Sanitary Officer.*—I was fortunate in having one officer, Captain R. G. H. Tate, who had just completed his tenure of office as deputy-assistant director of medical services (sanitation). I appointed him sanitary officer for the ship in addition to his other duties. He made daily a complete sanitary inspection, sometimes in conjunction with the troop-deck officer, and I am indebted to him for many valuable suggestions.

I cannot too strongly emphasize the importance of appointing one medical officer to the charge of sanitation on board ship. It is, of course, advantageous if the officer has special sanitary experience, but all medical officers have sufficient knowledge to do very useful work. It is impossible for the senior medical officer to learn much of the sanitary condition of the ship in his daily rounds with the officer commanding. In fact, I am doubtful as to the utility of this inspection from a medical point of view. If the senior medical officer went round once a week with the commanding officer it would probably be sufficient. The sanitary officer, dealing direct with the troop-deck officer, gets practically everything put right, and it is only exceptionally that the senior medical officer has to bring things to the notice of the officer commanding. An excellent practice pertains on the "Rohilla." A quarter of an hour before the morning round the commanding officer and the senior medical officer meet the captain of the ship in the latter's cabin, when points dealing with the troops generally are brought up.

*Orderly Medical Officer.*—In my opinion none should be detailed, except, of course, when in port. It is much better for all concerned if each officer answers calls from his own department. After all, duties on board ship are arduous for none; a list of medical officers, with the numbers of their berths after their names, should be posted in the hospital for the information of the orderly on duty.

*Hours for Hospital Duties.*—These appear to me to be unnecessarily long. I made a practice on both voyages of letting the men away, with the exception of one orderly, as soon as the work was finished, usually about one o'clock. They appreciated the privilege, and worked with greater zeal than, I think, they would otherwise have shown; it is not difficult to find a man on board ship if required, and it seems a pity to make the life more irksome than needful.

*Kits.*—Care should be taken that the kits of all invalids are brought at once to hospital, and placed in the store set apart for them. If this be not done the kits may find their way to the hold, and be difficult to recover in time to get them dispatched with the invalids to Netley. For men actually in hospital there are pigeon-holes for the kits. These should be numbered, the numbers corresponding with the numbers on the cots.

*Medical Inspections.*—I would respectfully suggest that the time has now arrived when inspections on board ship for venereal disease might be abolished. They are repulsive to all, and, in my experience, very little disease is thereby detected. An ordinary medical inspection of the entire complement, including officers and their families, should be held within twenty-four hours of reaching Suez, and a certificate made out to the effect that this has been done. This certificate should be given to the ship's surgeon, who presents it to the port health officer when he comes on board at Suez. If this certificate is tendered the health officer will probably make no further examination—a great advantage to all concerned.

*Hospital Clothing.*—I would suggest that a few suits of light hospital clothing, such as the hot weather pattern for India, be carried. The English hospital kit is far too warm to be worn with comfort east of Suez.

*Out-patients.*—In homeward-bound ships there is usually a great number of men attending hospital daily; unless these are classified in some way there is bound to be confusion. Before the hour of the morning visit the serjeant should divide them roughly into medical and surgical cases, the surgical patients being sent to wait



outside the separation ward, which should be fitted up as a surgical dressing room, the medical cases waiting outside the dispensary. This latter room is small, so no one but the medical officer seeing the sick, the serjeant, and one sick man should be allowed in the dispensary at the same time. These details appear trivial, but I have seen the confusion that occurs through not observing them; hence I have thought it worth while to write them down fully.

*Dressing of Out-patients and Preparation of Operating Room.*—By far the best arrangement is to have the separation ward fitted up as a surgical dressing room and theatre, unless this room is occupied, which in ordinary cases it will not be. In my first voyage I did not do this, but operated on a table in the passage, a most unsatisfactory arrangement, as it necessitated a headlight being fitted up, and part of the passage being screened off so as to make a room. The separation ward, which contains two beds and is well lighted, can be made into a capital little theatre and dressing room, and with a little thought it can be fitted up so as to be ready for an operation at any time. I will shortly describe the means I used myself on the last voyage and which answered very well. I worked on the lines I have been following for some years, and which I have from time to time described in the Journal.

The officer in charge of the brigade laboratory, Karachi, kindly gave me a dozen test-tubes which I filled with suitable lengths of linen thread and sealed with cotton-wool. I collected all the empty cigarette tins and sweetmeat glass bottles with screw-tops I could get on the ship, and filled them with dressings; towels I put up in empty biscuit tins. Having prepared a sufficient quantity, I put them all through the steam disinfecter for twenty minutes. This disinfecter has a pressure of thirty pounds to the cubic inch, which is much more powerful than the ordinary high-pressure sterilizer in use in military hospitals. After sterilization the tins were sealed with tape plaster, and the tubes with gutta-percha tissue till required for use. The bed-cots can be made into efficient dressing-tables by filling them with spare mattresses. If a more resisting surface is wanted, it can be secured by placing a couple of boards on the top. Instruments were boiled in the electric sterilizer in the dispensary. Each morning, before dressing the cases, a sterile towel was spread on a bed-cot, a few tins opened, and the instruments boiled. One day I had a rehearsal to see how quickly the room could be prepared for an operation. I told the orderly in charge to get the room ready for an appendicectomy. He reported after twenty minutes, and I found everything in perfect order. He

said that with a little practice he could do it quicker. The thing which takes most time is the boiling of the instruments.

With regard to operation equipment, I would make the following suggestions. The new pattern capital case should be supplied, or, at any rate, six additional artery forceps and a couple of retractors; a few gowns should be furnished for the use of the operator and his assistants. I know there is a prevailing idea that operations are not likely to be required on board ship, but one never can tell. On my first voyage home this year I had to operate on an officer with appendicitis. On the last voyage there were three cases of appendicitis. Luckily they were of a mild type, and did not require operation. It is also presumed that a man can always be put on shore at the nearest port. Not only does this cause delay to the ship and great expense—I think I am right in saying that the harbour dues at Malta are about £70—but waiting may cause the loss of the patient's life, so it is well worth while to operate on board.

*Hours of Dispensing.*—It is important to have these fixed, say from 2 to 4 p.m., otherwise prescriptions will be coming in all day. In the same way an hour and place should be fixed for consulting the officer in medical charge of officers and their families. The saloon is a suitable place for seeing him, and a good hour is 11 a.m.

*Insanes and Men under Detention.*—Hours must be fixed for their exercise.

*Empty Cabin for Emergency Cases.*—One cabin should be reserved in the first class for these. It is a common practice to allow every cabin to be filled on the homeward voyage. This should not be permitted.

I consider that it is most desirable to have at least one woman trained in nursing for duty in the women's hospital. She need not be a qualified nurse, but she should have some general knowledge of sick nursing which most stewardesses do not possess. The need of this was felt on the last voyage.

*"Man Overboard."*—On the "Rohilla," "Man overboard" was practised. It is as well to have a few simple directions written out for the information of the medical personnel. The main thing is to have the lift raised. The rest is pure hospital routine and need not be gone into here.

*Warm Clothing.*—It should be remembered that there is often a rapid fall of temperature on entering the Canal, and an order should be published as to the wearing of great-coats after sunset.

*Returns.*—These are clearly dealt with in the regulations, and it

is unnecessary to say much about them. They involve considerable clerical labour and should be commenced several days before the completion of the voyage. They must be separated into two lots, those for the embarkation medical officer, and those for Netley which are taken by the medical officer proceeding by the hospital train.

*Patients for Netley.*—All patients for Netley should be assembled in the hospital on the ship being brought alongside, and women and children accompanying them should wait in the women's hospital; otherwise there may be difficulty in finding them in the confusion which usually occurs on the last day.

It has been suggested that the commanding officer and the adjutant, the senior medical officer and the quartermaster be made permanent officials for the trooping season. That it would increase the efficiency of the trooping service there is little doubt.

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## THE ORGANIZATION OF VOLUNTARY AID FOR WAR.

BY CAPTAIN C. R. SYLVESTER BRADLEY.

*Royal Army Medical Corps.*

THE scheme for the peace organization of voluntary aid in this country has now been in force for some years; as a result there are a number of voluntary aid detachments scattered over the country, the members of which are more or less trained in "first aid" and "nursing." Some detachments have gone so far as to arrange for the formation of hospitals in time of war; some have contented themselves with collecting various quantities of stores and equipment; and in some counties an administrative control of the detachment has been organized.

There is no doubt that a large amount of credit is due to all members of the voluntary aid organization for the general efficiency that has been attained. The value, however, of voluntary aid in this country can only be estimated by its usefulness as an adjunct to the territorial medical service in time of war. It is well known, or should be well known, that the duties of voluntary aid detachments on mobilization are not the performance of "first aid" on the battle-field, but their co-operation with the Territorial Royal Army Medical Corps in forming, or helping to form, the medical units for the disposal of sick and wounded in the evacuating and distributing zones. In other words, to help to form the clearing and general hospitals which only exist in nucleus form during peace, and also to provide units corresponding to the stationary hospital, convalescent depot, and ambulance train of the expeditionary force. If voluntary aid detachments are to carry out these duties efficiently after mobilization, it is essential that the co-operation of voluntary aid and the territorial medical service should take place beforehand.

The Territorial Force is administered both in peace time and after mobilization on a divisional basis, and the assistant director of medical services of the division, as the technical adviser of the general officer commanding on all medical matters connected with the division in peace time, is the only person who can make arrangements for the co-operation of the medical service and voluntary aid. As I am unaware of this having been carried out in any of the other territorial divisions, I venture to explain what has been done in the Wessex Division.

The Wessex Division has many difficulties to contend with, as

its territorial area includes six counties; it has, however, the advantage of having one county which excels in its voluntary aid organization, and a county director and staff who fully recognize the importance of a war organization.

The following memorandum with regard to the employment of voluntary aid detachments in the Wessex Division on mobilization was forwarded by the assistant director of medical services to each county director, and to each secretary to the county associations, asking them to carry out as far as possible the instructions contained therein :—

**MEMORANDUM WITH REGARD TO THE EMPLOYMENT OF VOLUNTARY  
AID DETACHMENTS IN THE WESSEX DIVISION ON MOBILIZATION.**

(1) The circumstances in which voluntary aid may be called upon to co-operate with the territorial medical service are as follows :—

- (a) In the period between the arrival of units at their war stations and the commencement of hostilities.
- (b) After hostilities have occurred.

(2) The arrangements for the disposal of casualties during the period between the arrival of units at war stations and the commencement of hostilities are as follows :—

- (i) Sections of field ambulances will form “reception hospitals” at war stations. The daily sick will, in the first instance, be sent to these hospitals, and then either returned to their units when “fit,” or disposed of to the territorial general hospitals at Gosport and Plymouth.
- (ii) The territorial clearing hospital will not be utilized, but will be trained for its future duties at its war station. The V.A.D. personnel will not be called up until instructions to that effect are issued.
- (iii) During this period the only service of voluntary aid will be to have in readiness the necessary personnel to complete the clearing hospital and the two general hospitals. County associations are responsible for finding the personnel to complete the general hospitals, but they look to voluntary aid detachments to relieve them of this duty. Eighty male members of voluntary aid detachments will be required for the clearing hospital, and sixty-six for each general hospital.



- (iv) The personnel to complete these hospitals will be chosen from those members of voluntary aid detachments who volunteer for service outside their own counties. They will receive the same remuneration and have to undertake the same obligations as the Territorial Royal Army Medical Corps.

County directors, when submitting rolls of volunteers for service outside their own counties, should state any special qualifications that members possess: for example, qualified medical men, certificated nurses, carpenters, cooks, clerks, &c. Names will not be required, but simply the numbers that will be available.

(3) As soon as hostilities are likely to occur in the vicinity of war stations, the reception hospitals formed by field ambulances will be closed, and the latter will carry on their ordinary duties in the field. The disposal of sick and casualties from now onwards will take place in this manner:—

- (i) Casualties will be collected from regimental units by field ambulances, and by them transferred to the territorial clearing hospital, which is a mobile unit, and will generally be placed at the railhead nearest to the fighting troops.
- (ii) The clearing hospitals will either send casualties back to their units as “fit”; send serious cases to the general hospitals at Gosport and Plymouth; or send the milder cases to temporary hospitals formed by voluntary aid detachments.
- (iii) In order that the full value of their services may be utilized, county directors should submit returns showing the locality and accommodation of the temporary hospitals they are prepared to organize and equip as soon as hostilities occur. It is thought desirable that the accommodation of temporary hospitals should be for not less than twenty-five patients; and no hospital should be shown in the return which is not complete as regards personnel, buildings, equipment, and the necessary arrangements for carrying on the working of the hospital, such as feeding and clothing of staff and patients, and the provision and replenishment of medical stores.

The personnel recommended as a guide for a temporary hospital is shown in Appendix A.

- (iv) County directors will act as mobilization officers for their own particular counties. On a general mobilization being

ordered, the final arrangements for mobilizing these temporary hospitals should be made, but no work actually put in hand until instructions for opening them have been received.

- (v) Another service county directors will be asked to arrange for is to provide the personnel and equipment for rest stations. The positions of rest stations cannot be given until the localities of active operations have been ascertained. They will, however, as a rule be formed at all railway stations where the entraining or detraining of casualties takes place, and also at junctions and sidings where delays in train service may occur. The main duties of rest station parties will be the feeding and "dressing" of the wounded before their further disposal.

The personnel recommended as a guide for rest station parties is shown in Appendix B.

- (vi) Voluntary aid detachments may also be called upon to assist in the railway transport of the wounded. For this purpose each county director is asked to establish a nucleus of a "temporary ambulance train."

The personnel recommended is identical with that suggested for a rest station party (Appendix B).

The special form of apparatus recommended for converting ordinary rolling stock to a "temporary ambulance train" is the Wolf Hohmann. If the six county directors in this division would each make himself responsible for providing five of these Wolf Hohmann frames, sufficient material would be available for forming one complete "temporary ambulance train" in the division.

- (vii) When county directors have sufficient personnel and equipment, or other facilities for providing a convalescent home on mobilization, the locality and accommodation of the proposed home should be notified to this office. A convalescent home should, if possible, be on the main line, and near some large town where supplies are not likely to run short. For administrative reasons these "homes" should be as large as possible and capable of extension.

(4) These instructions are in no way antagonistic to the general scheme for the peace organization of voluntary aid; but individual voluntary aid detachments must be looked upon as "training units," and *not* as the completed personnel of a temporary hospital,

which will have to be made up according to the size and requirements of the temporary hospital in question, and may often necessitate the selection of individuals from different detachments.

(Signed) C. R. SYLVESTER BRADLEY,  
Captain, R.A.M.C.

For Assistant Director of Medical Services,

EXETER, January 1, 1914.

Wessex Division.

#### APPENDIX A.

##### PERSONNEL RECOMMENDED FOR A TEMPORARY HOSPITAL OF TWENTY TO THIRTY BEDS FORMED BY VOLUNTARY AID DETACHMENTS.

			PERSONNEL					
Detail			Men			Women		Total
Medical Officer	...	...	1	...	...	—	...	1
Quartermaster	...	...	—	...	...	1	...	1
Lady Superintendent	...	...	—	...	...	1	...	1
Wardmaster	...	...	1	...	...	—	...	1
Pharmacist	...	...	1	...	...	—	...	1
Clerks	...	...	—	...	...	2	...	2
Nurses	...	...	—	...	...	10	...	10
Cooks	...	...	—	...	...	3	...	3
Washerwoman	...	...	—	...	...	1	...	1
General Duty	...	...	6	...	...	3	...	9
Total	...	...	9	...	...	21	...	30

#### APPENDIX B.

##### PERSONNEL RECOMMENDED FOR REST STATIONS FORMED BY VOLUNTARY AID DETACHMENTS.

Detail	PERSONNEL						Total	
	Men			Women				
Medical Officer ...	...	1	...	...	—	...	...	1
Lady Superintendent ...	...	—	...	...	1	...	...	1
Quartermaster ...	...	—	...	...	1	...	...	1
Clerk ...	...	—	...	...	1	...	...	1
Cooks ...	...	—	...	...	3	...	...	3
Nurses ...	...	—	...	...	10	...	...	10
General Duty ...	...	*6	...	...	2	...	...	8
Total	...	7	...	...	18	...	...	25

\* For an ambulance train one of these men should be a carpenter.

#### APPENDIX C.

##### REVISED NOMENCLATURE OF HOSPITALS TO BE FORMED ON MOBILIZATION OF TERRITORIAL FORCE, WESSEX DIVISION.

(1) *Reception Hospitals*.—These are only formed by field ambulances at war stations, and will be closed as soon as hostilities are imminent.

(2) *Clearing Hospital*. (For 200 sick).—This is now a definite Territorial Force unit, and a nucleus of this hospital is being formed at Exeter. This unit is for the purpose of receiving sick

from field ambulances and distributing them to temporary or general hospitals.

(3) *Temporary Hospitals*.—This name will only be applied to hospitals formed by voluntary aid detachments.

(4) *General Hospitals*.—These hospitals have accommodation for 520 beds. A nucleus of these hospitals exists at Gosport and Plymouth.

*Note*.—A stationary hospital does not exist in the Territorial Force.

A record is kept by the assistant director of medical services of all members of voluntary aid detachments who volunteer for service outside their own county, and, from the returns already received, it is pretty certain that sufficient personnel will be forthcoming to complete both the clearing hospital and the two general hospitals on mobilization. Records are also kept of the number, locality, and accommodation of temporary hospitals, and as soon as hostilities occurred the county directors would be informed which hospital it was proposed to mobilize. It may be said that such elaborate preparations are surely unnecessary, and that there will be ample time to carry out such arrangements on or after mobilization. If we were allowed six months in which to mobilize, this argument might hold good; but the indications at the present time are that if we ever do have a war in this country, we shall wake one morning to find the enemy at our door. It therefore behoves us to make preparation in times of peace, if we would not see our soldiers suffer from the disastrous results of a faulty medical organization.

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## United Services Medical Society.

### SOME EXPERIENCES OF THE BALKAN WARS.

By MAJOR E. T. F. BIRRELL.

*Royal Army Medical Corps.*

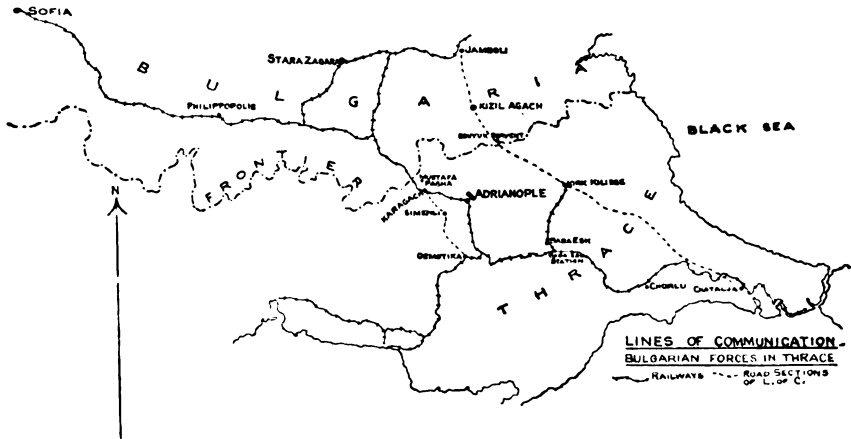
IN November, 1912, during the first Balkan War, the British Red Cross Society, which had already sent expeditions to Montenegro and Greece, and appointed Surgeon-General G. D. Bourke, C.B., its director for the Balkan States, despatched two units to Bulgaria. Each unit consisted of three surgeons, four dressers (medical students), and twelve men as nursing orderlies, general duty orderlies, and cooks. In one unit, in place of a dresser, an X-ray operator was included. The society appointed me commandant for their services in Bulgaria, and Major C. Hudson, D.S.O., I.M.S., to the command of one of the units. Captain W. Byam, R.A.M.C., was one of the officers, and the others were civilians, viz.: Dr. Cecil Clarke, of the staff of the Brompton Hospital; Mr. R. D. O'Leary, of the staff of the Dreadnought Hospital; and Mr. C. Pasley, of the Westminster Hospital. As X-ray operator, we were fortunate in securing the services of Mr. H. W. Cox himself.

The equipment of each unit was practically the medical and ordnance equipment of a section of a field ambulance, without tents or vehicles, but with the addition of the then field-pattern X-ray apparatus and a small petrol motor; some special surgical equipment, such as large sterilizers and a portable operating table; a large quantity of blankets, meat extract, milk, chocolate, biscuits, &c.; a supply of iodine, iodide of potash, operating gowns, and india-rubber gloves, stovaine and apparatus, eucaine, emetine, antityphoid vaccine, and last, but not least, insect powder.

Again, in August, 1913, the society despatched a relief section to Sofia. The equipment was much the same, with the addition of large stores of dressings and invalid food, but no blankets or hospital clothing. The section comprised three surgeons, myself as commandant, Dr. C. J. R. MacFadden, in practice in London, and Captain A. N. Dickson, I.M.S.; the men were two of the best of those who were with me on the first occasion, a man who had done good work in Montenegro, and an X-ray operator from Messrs. Cox and Co. In Sofia Mr. R. D. O'Leary joined the section.



On the first occasion the units (Bulgaria Units No. 1 and No. 2) left England on November 3, 1912, and arrived at Sofia on November 7, where they came under the direction of Surgeon-General Bourke. Being ordered to move to near the front and form a hospital, search was made in Sofia for material to complete our equipment, and quantities of cloth for mattress cases, pillows, sleeping suits, shirts, &c., were bought, as well as needles, thread, soap, brushes, and so on. We were provided with interpreters and despatched to Stara Zagora on November 9 by rail, and thence further east to Jamboli, at that time railhead on the eastern line of communication.



During our journey we had seen three types of ambulance trains: (1) In Serbia, a specially fitted up train consisting of covered baggage wagons for patients, painted white with red crosses, and each fitted inside with eight wooden berths in two tiers, besides ordinary passenger coaches (also painted white) for the surgeons and attendants. There was no through communication, but judging by our own travels, halts with such trains were probably frequent and prolonged. (2) In Bulgaria, ordinary passenger coaches, with wounded sitting or lying on the seats. (3) Also in Bulgaria, ordinary baggage wagons, with a little straw or matting for the patients to lie or sit on. Although the reverse of luxurious, these wagons were close-coupled and covered, and were therefore more suitable than our British chain-coupled open trucks.

From Jamboli it was necessary to complete the journey to Kirk

Kilissee, our destination, by road. Transport was provided, with an escort and a guide (a deputy of the Sobranje) who was furnished with authority for demanding billets. We were also authorized to requisition supplies if they could not be obtained on payment.

The first stage, as far as a place called Kizil Agach, was performed on motor lorries and motor-cars, the baggage having been sent on ahead under escort and a baggage party. From Kizil Agach, General Bourke was recalled to meet the expedition commanded by Major H. E. M. Douglas, V.C., D.S.O., destined for Servia, and the units set out to march the remainder of the way to Kirk Kilisse. The march was interesting and instructive. It followed for the most part the convoy route used for the supply of the army at Chatalja and the evacuation of wounded from the front. Our convoy had to be arranged so that it kept together. Consisting as it did of bullock and buffalo wagons, and pony wagons, it was necessary to regulate the pace, and accordingly a section of buffalo or bullock wagons always led, while one or more empty pony wagons (ready to be loaded should a breakdown occur) brought up the rear under a baggage guard, consisting of an officer, a dresser, and four N.C.Os. and men. The main party was distributed among the wagons, and no straggling was allowed. Having been provided with a map, the plan of the march was arranged beforehand, so as to coincide more or less with the ordinary halting places of other convoys, in order to be sure of obtaining supplies.

Each morning a billeting party, consisting of the guide and one of the interpreters, with the cooks, went on ahead in pony wagons to the place selected for the midday halt. There they collected such supplies as the place afforded—a pig or a sheep, and perhaps some bread, and the cooks prepared a meal. After the halt, the billeting party and cooks went on again to the place for the night's halt, and gave warning for the billets required, and again arranged, or tried to arrange, for a meal. The main body would arrive any time between 7 and 9 p.m., and we were fortunate if supper was served at 10 and billets allotted at 11 p.m. Next morning a start before dawn was always attempted, but seldom accomplished. Billeting in a Bulgarian or Thracian village was no simple matter to a commanding officer. One's men were taken away in twos and threes by a number of villagers—friends or relatives of the mayor—and where they went to nobody could tell. Next morning they turned up at the hour appointed at the wagons or the place where supper had been served, but one or two

were generally missing for perhaps an hour, in spite of all the whistling and shouting one could do. In the darkness one house looked just like another, and the local officials were never forthcoming to say where they had put the men overnight. As often as not, the billets were so unpleasant that men preferred to bivouac or sleep in the wagons.

The parking places for convoys, having been used before repeatedly, were unsavoury enough, being littered with manure, and every hedge and wall and empty house showed too obvious traces of the human streams that had passed through. Many villages were deserted, or semi-deserted; one, near the battlefield of Seliolo, had suffered from shell-fire, and several of the ruins were blackened, burnt perhaps from the scattering of the domestic fires when the houses fell.

Kirk Kilisse was reached on November 17, a Sunday, and on the 19th, it was decided to give us a block of the new barracks, about two miles from the town, as a hospital. We took it over next day and it was ready for our first convoy on November 25.

#### THE SITUATION IN KIRK KILISSE IN NOVEMBER, 1912.

During the winter, 1912-13, Kirk Kilisse was the Bulgarian advanced base for their eastern front. It was garrisoned by regular troops and militia regiments (i.e., men in their last years of reserve service) and governed by a commandant of the garrison and a commandant of the town. Several of the officers employed in the various offices were from the reserve or retired list, and many had been wounded or sent back sick from the front. General headquarters and the headquarters of the medical service were established there, and for a time His Majesty King Ferdinand was present. There were four Bulgarian line of communication hospitals, and an isolation hospital, besides two Russian, an Austrian, a German, and two British hospitals (our own and the well-managed hospital of the Women's Convoy Corps, under Mrs. Stobart). Local medical administration was in the hands of the local sanitary committee, consisting of a lieutenant-colonel of artillery and a major of the medical service (a reserve officer, an aural specialist in civil life). The town lies near the southern base of the Rhodope Mountains with the "downland" of Thrace stretching away to the east, north, and south of it. The city is remarkable for the spires of its many mosques, and for the vineyards which surround it.

When we first arrived heavy fighting was taking place at Chatalja (November 16-18), and wounded began to come into the town before we opened our hospital. The first to arrive were slight cases treated as out-patients, but many seemed quite sufficiently severe to have required hospital accommodation, looking hungry and worn out, their greatcoats ragged and stiff with mud, and their bandages soaked in pus and blood, some actually dripping with discharge. The hospitals, however, seemed to be crammed even to the passages and landings. Convoys were formed on November 19 to relieve the pressure in anticipation of more serious cases coming in; but one cannot help thinking that earlier evacuation might have been possible. From the building which we were given, some 200 wounded were sent away the day before we took over, and all except about half a dozen were sufficiently recovered to be able to walk to the wagons half a mile away. They had, however, only been included in the convoy on our requesting that the place be emptied so that we could clean and equip it.

#### THE SERVICE OF EVACUATION IN THRACE.

The service of evacuation in Thrace must have presented no easy problem to the Bulgarians. It will be observed from the map that the railway from Sofia divides at Philippopolis, one branch running north-west to Stara Zagora and Jamboli, the other south-east to Mustapha Pacha, Adrianople, Demotika, Baba Eski (with a branch line north to Kirk Kilisse), Chorlu, and Chatalja. From a small station called Karagach, near Mustapha Pacha, as far as Demotika, the south-eastern line was not available, owing to the Turkish garrison in Adrianople. To overcome this difficulty a road section was interposed between Karagach and Demotika, but this necessitated the construction of a road between Karagach and Simenli, and the bridging of the River Arda at the latter post. This accomplished, a regular convoy route (much of it motor transport) was established, but not until about Christmas. In the meantime the alternative route via Jamboli by road to Kirk Kilisse, by which we ourselves had travelled, was used for forwarding supplies and evacuating wounded.

From Chatalja wounded arrived by train, via Chorlu (where there were field hospitals) and Baba Eski Junction (where there was a rest station). The journey occupied sometimes three days, the rolling stock being vehicles captured at Kirk Kilisse and elsewhere on that section, which would have been more useful had

sufficient engines been captured at the same time. At first, I believe, only two were available.

In Kirk Kilisse when a convoy was to be despatched, the bullock and buffalo carts which had brought supplies and ammunition from Bulgaria were sent to the various hospitals to be loaded. These wagons are simply-constructed wooden affairs, springless, with movable sides, and a tilt of coarse canvas or blanket. They carried about half a ton each. Usually the fodder for the animals was spread out on the floor, and one wounded man could be carried lying down, or three sitting. They yielded and twisted to inequalities of the ground, and were not unsuitable for sick transport, although a man with a recent fracture would have suffered. Very severe cases, however, if moved, were generally, we noticed, lying on litters with high sides and thick mattresses which must have minimized the jolting considerably. Each patient had to be given three days' bread and three days' cheese ration, and the under-officer in charge was furnished with a nominal roll showing the disease or wound.

The loaded wagons from the hospitals were marshalled under the orders of the commandant of the garrison in some part of the town, where they were inspected to see that the men were warmly clad and properly provided for before leaving. The convoy then started on its five or, if no motor transport was available for the stages between Kizil Agach and railhead, eight days' journey to Jamboli. These convoys halted at night at the various stages, the wounded sleeping in the wagons or wherever shelter was available. There was a rest station at Biyuk Dervent, and hospitals were established at Kizil Agach and Jamboli. As far as I know, no medical personnel, certainly no doctor, accompanied them. We met several such convoys on our way down, long strings of wagons with a few militiamen as escort. The wounded seemed fairly comfortable and were at least cheerful, but some moaned continuously. The remainder of the journey by rail was in ordinary passenger coaches or baggage wagons as already described. At many stations *en route* the Bulgarian Red Cross Society had established rest stations, or at least places where bread could be obtained. The rest station at Baba Eski consisted of two waiting rooms, one with tables and benches and four beds, the other with tables and benches and a cooking place. A doctor, with some voluntary aid sisters and men, was in charge, having also a small hospital close at hand. When we returned to Bulgaria in August, we noticed men wearing Red Cross brassards accompanying every train.



The evacuation service via Demotika was by rail as far as that town, where there were several hospitals, then by motor lorry or motor ambulance wagon to Simenli, where there was a rest station and a field hospital, and then on either by motor ambulance wagon or pony cart to the railway line at Karagach, where there was another rest station. Lorries could not use the pontoon bridge over the Arda. The motor ambulance wagons were Daimlers, holding eight sitting, four a side, and had solid rubber tyres, and canvas tilts. Having solid tyres, they soon shook themselves to pieces, but the Bulgarians spoke well of a fleet of Laurin-Klement, 30 horse-power wagons with pneumatic tyres which we saw the following summer. These carried four lying down on stretchers, or eight sitting. I do not know how many lying-down cases the Daimlers carried. The motor lorries were much the same type as our own, but lighter, carrying  $2\frac{1}{2}$  tons, and holding about twenty men sitting and standing.

Arrived in Bulgaria, wounded were distributed to hospitals in Stara Zagora, Philippopolis, and Sofia, and, at any rate in the summer campaign, to Kustchuk on the Danube when Sofia became too crowded.

#### SANITARY NOTES.

By far the greatest sanitary problem at Kirk Kilisse was the supply of water. None was laid on to the hospital, and the nearest source was a shallow well in the enclosure, which yielded a small quantity of very dirty water. The regular source was from a spring about a mile and a half away, from which water was brought in barrels on bullock carts. It was then emptied for storage into large galvanized iron tanks. But anyone could, and did, dip any promiscuous utensil into the tanks; special dippers always disappeared. Subsequently, after much delay, a raised tank was arranged, with a semi-rotary pump to lift the water from the water carts, and a length of hose-pipe with a stop-cock for delivery. This might have worked well, had not hard frost immediately come on and put it out of action for the remainder of our stay.

Not only was the water supply liable to be fouled in distribution, but the supply itself was always short, and too frequently wanting altogether, bullocks (which were brought from the town) not turning up, or the cart breaking down on the muddy roads. We had no place in which to stable the animals or accommodate their drivers, and they refused to sleep in tents. It was very difficult to

obtain any degree of cleanliness in the wards, and general baths for patients could never be provided.

For drinking purposes it was considered useless to rely on boiling the water. It would have been impossible to ensure its being properly carried out. For the wards, drinking water was distributed in earthenware goblets like those used in India, into each of which two tablets of bisulphate of soda were placed. Tea was issued to the personnel at every meal. Either after, or on account of these precautions—I should not like to be dogmatic about it—no ill effect could be traced to the drinking water.

In Sofia, in summer, house-flies, both the common and the lesser house-fly, were great pests. They swarmed in the hospital and in our tents. In the wards they were attracted by the bread and remains of other food which the Bulgarians loved to keep on their bed-head tables and on the window-sills, and they seemed also to enjoy the stuffy warmth so congenial to the patients. Cleanliness and ventilation, of course, reduced the plague, and fly-papers gave some respite, but the source of the flies was too widespread for local measures to have much effect. All around us troops and transport had encamped, and the ground was left uncleaned. The latrines of the hospital were of the local cess-pit type, i.e., square pits about six feet deep and four feet wide for a single latrine, not cemented or bricked in any way, covered with boards in which was an oval or triangular hole for use in the squatting position, a shed and door completing the arrangement. These places smelt abominably in the heat and swarmed with flies, while the pits themselves were crawling with large white maggots, about 1 to 1½ in. long. After thorough washing of the woodwork and sprinkling with lime had been tried without much success, the use of kerosene oil solved the problem. The woodwork was sprinkled daily (after washing), with kerosene oil from a watering can, and once a week about half a pint or a pint was poured into each pit. This immediately caused the death by suffocation of the maggots, which floated motionless on the surface, and it acted as a deterrent in keeping away the flies. The latrines became the most fly-free part of the whole hospital. What the maggots were I do not know; they were too large to be the larvæ of house-flies.

#### MEDICAL NOTES.

The diseases of chief interest during the first and second Balkan Wars were cholera and enteric fever. Cholera, fortunately, never came the way of our hospital in Kirk Kilisse, and only a few

imported cases occurred in that town. But at Chatalja some 23,000 cases with, however, only 3,000 deaths, occurred. Professor Krause, of Vienna, satisfied himself, I believe, that it was true cholera. Nevertheless, the case mortality (if my figures are correct, and they were said to be official) is remarkably small, about 13 per cent. On the other hand, when the Roumanian Army occupied part of Bulgaria in the summer they suffered from cholera of a severe type with a case mortality of 50 or 60 per cent. The Bulgarians considered that the Roumanians must have brought the cholera with them (there were a few cases about the same time in Roumania), as it was so much more severe than that which had affected the Bulgarians. Whether this was so, or the Bulgarian is accustomed to and partly immune from, his own cholera microbe—which, however, finds a more susceptible host in a stranger—is a matter for bacteriologists.

Enteric fever was fairly common during the first war, but in the second we saw only one case. We ourselves admitted only two cases in Kirk Kilisse, but in the Russian hospital, next to us, were many cases. These, as well as our own, were treated by Dr. C. Clarke with typhoid vaccine kindly given us by the Royal Army Medical College. The clinical effects were really striking and most satisfactory. As a rule, the disease followed its course, but the difference in the general condition of the patients was such as to lead one to conclude that the treatment counteracted all excess of toxin; the face cleared up, the nervous symptoms disappeared, the tongue became clean, and appetite returned.

There were two cases of typhus exanthemata in one of the Russian hospitals at Kirk Kilisse, one admitted from a convoy, the other developing in the hospital. Neither was isolated, but the occurrence of the second seems to show that the Russian patients were no more free from pediculi than were ours; and we could not claim that we were free from these pests, in spite of sulphur fumigation of clothing when possible, insect powder, and the small-toothed combs which the soldiers used on themselves.

A medical question of some interest was the sugar hunger from which patients and we ourselves suffered. The Bulgarian war ration (Table I) includes 14 oz. of fresh mutton or beef, or 7 oz. of cheese or salt fish, 2 lb. 10 oz. of fresh bread or 1 lb. 5 oz. of biscuit, 3½ oz. of beans or other vegetables, dried or fresh, 7 oz. of potatoes, and 1½ oz. of sugar. Our war scale allows 2 oz. of sugar and 4 oz. of jam, 1¼ lb. of bread, and 1¼ lb. of fresh meat, or 1 lb. (nominal) of preserved meat, besides beans and cheese as normal

TABLE I.

BULGARIAN FIELD SERVICE RATION, BALKAN WAR, 1912-13.					BRITISH FIELD SERVICE RATION, 1913.				
		Amounts		Calories (approximate)*			Amounts		Calories
		Kilos	lb. oz.				lb. oz.		
I	Bread ..	1.200	2 10½	3,128	Fresh meat, or	1 4	1,298		
	or				Preserved meat	1 0	807		
	Biscuit ..	.600	1 5½	2,192	Bread, or	1 4	1,516		
	or				Biscuit, 1 lb.		1,853		
II	Flour ..	.750	1 10 <sup>11</sup> / <sub>16</sub>	2,701	or flour				
	Beans	—	—	358	Bacon ..	0 4	756		
	or				Tea ..	0 <sup>5</sup> / <sub>8</sub>	—		
	Rice	.100	0 3½	355	Cheese ..	0 3	402		
	or	Or a mixture		333	Peas, or	0 2	207		
	Dried peas	of these up to			Beans, or	0 2	201		
		.100		Potatoes	0 2	210			
	or			Jam ..	0 4	362			
Potatoes ..	.200	0 7	183	Sugar ..	0 3	313			
III	or				Salt ..	0 <sup>1</sup> / <sub>2</sub>	—		
	Fresh ..	.100	0 3½	44	Mustard ..	0 <sup>1</sup> / <sub>16</sub>	—		
	vegetables				Pepper ..	0 <sup>1</sup> / <sub>16</sub>	—		
	Salt ..	.025	0 <sup>8</sup> / <sub>128</sub>	—	Lime juice, <sup>1</sup> / <sub>16</sub> gill		—		
IV	Sugar ..	.020	0 <sup>1</sup> / <sub>16</sub>	75	Rum, <sup>1</sup> / <sub>2</sub> "		—		
V	Lard ..	.050	0 1½	439	Tobacco, per	0 2	—		
VI	Red pepper	.003	0 <sup>1</sup> / <sub>16</sub>	—	week				
VII	Tea or coffee	.005	0 <sup>2</sup> / <sub>128</sub>	—	Fresh vegeta-				
VIII	Bay leaves	.001	0 <sup>1</sup> / <sub>128</sub>	—	bles when				
	Mutton ..	.400	0 14 <sup>1</sup> / <sub>16</sub>	1,040	available;				
	or				when these				
	Beef ..	.400	0 14 <sup>1</sup> / <sub>16</sub>	1,003	are supplied,				
	or				peas, beans,	0 8	70		
	Pork ..	.500	1 1½	1,457	dried pota-				
	or				toes, and lime-				
	Lamb ..	.500	1 1½	1,103	juice will not				
IX	or				be required				
	Cheese ..	.200	0 7	810					
	Salt fish ..	.200	0 7	132					

## Total Calorie Value.

When mutton or beef, bread, and fresh vegetables were issued:—

Calories, 4,700 (approximate).

When pork, bread, and beans were issued:—

Calories, 5,400 (approximate).

## Total Calorie Value.

When fresh meat, bread, and fresh vegetables are issued:—

Calories, 4,717.

When preserved meat, biscuits, and dried vegetables are issued:—

Calories, 4,704.

\* These calorie values were kindly worked out for me by Captain G. A. D. Harvey.

constituents. Lard  $1\frac{3}{4}$  oz. was allowed in the Bulgarian ration, but not issued, so far as I know, in Kirk Kilisse. As will be seen from Table I (in which the British field service ration is also shown for comparison), the total calorie value when mutton or beef, bread, and fresh vegetables were issued is approximately 4,700, or almost the same as our own, and nearly 5,400 when pork and beans are substituted. Although the total calories of the Bulgarian ration may be satisfactory, we found the quantity of bread far greater than we could assimilate, while the meat and sugar rations were too small for our needs, and the want of fat was also felt. Marching down to Kirk Kilisse we had been on short commons, and although we were on the war ration during the busiest time when arranging the hospital and taking in our earlier convoys, meals were often scanty and ill-cooked. Consequently, we were almost constantly hungry, and what we craved for was sweet things. Each man's sugar ration was jealously scrutinized, and it was a mark of great favour to give a portion of one's allowance to anyone who was specially in need. But our sugar hunger was nothing to that of the patients, who kept asking for more sugar (which we could not obtain for them) until it was a regular obsession. One man in particular, wounded through the face, suppurating profusely and unable to eat solid food, appeared to talk on no other subject; he would accost anyone, messengers or casual visitors, asking them to get him "zachar" (the Bulgarian for sugar). At the front, no doubt, rations had not been issued regularly, and the patients' sugar hunger was the result not only of semi-starvation, but of the tissue-waste of suppuration.

#### SURGICAL NOTES.

Having now been in a position to compare the wounding effects of the Turkish sharp-pointed bullet (calibre of rifle, '301 inch) with those of the ogival-tipped Servian and Greek bullet (calibre of rifles, '276 and '256 respectively), one can only say that no difference was observable.

All our wounded in the first and second wars, except one case in the first war, were septic on admission. Those which we received from Chatalja had been plugged with gauze where there was any likelihood of hæmorrhage, and on removing the plug pus gushed out as if from a bottle. As a rule, so long as drainage was secured it did not matter whether cases were subsequently treated with wet or with dry dressings, both forms of treatment gave equally good results.



Our dressings were partly those of the army field equipment, partly ordinary sterile material in packages. The former, strongly impregnated with mercurial antiseptics, were found to irritate the skin, and gave rise to "scars" of erysipelas from the consequent rash. We were able to sterilize locally-purchased gauze and wool by means of the large sterilizers sent out with one of the units. The small sterilizers in the field equipment are only of use for instruments.

In both wars the value of iodine was abundantly proved. The army pattern equipment we took with us had not been brought up to date by the addition of the alterations approved for the service, and contained no iodine tablets, but we took instead a quantity of resublimed iodine and of iodide of potash. We had only the spirit contained in the canisters for the sterilizers; consequently it was decided to use watery solutions, and a 10 per cent stock solution was used for issue. This was easily made by dissolving twice the quantity of iodide to iodine in warm water. Diluted to pale sherry or brown sherry colour, it served for lotions, irrigations, washing of hands or gloves, and (a little darker) cleansing of dressing instruments. The stock solution painted on the skin was practically the only preparation before operation, and it proved perfectly successful, clean operation wounds healing by first intention. It was also used in this strength for a case of erysipelas of the head, with results as good as could be expected from a solution in alcohol. In fact, we could find no practical difference between the results with iodine without alcohol and iodine in alcoholic solution. For its preparation a large measure glass (half or one pint) is needed, and a set of scales and weights. Neither is available in our field equipment.

Foreign observers have, I believe, written against the use of iodine from their experience in the Balkan Wars. Possibly, however, this condemnation is due to the abuse of this antiseptic which we also noticed. The favourite Bulgarian daily application to a wound in all stages was a strong alcoholic solution of iodine, on a swab at the end of a stick, and the result was a blackening of the raw surface and a total absence of granulations. More moderate treatment speedily resulted in a healthy reaction.

We did not use stovaine in either war. The apparatus was broken at Kirk Kilisse in sterilizing it the first time, and one really felt diffident about subjecting the rather suspicious and timid Bulgarian patient to a major operation in a state of consciousness. Eucaïne sufficed for small operations, so long as no manipulations

were necessary, such as searching for a bullet with the finger. Then it failed, and a general anæsthetic was needed.

India-rubber gloves saved much time in passing from patient to patient. It was so easy to sterilize them in strong iodine—stronger than one would care to have used for the naked hands. They were also, of course, a protection to the surgeon in dealing with so many foully septic cases.

Operation gowns were also a necessity. One's own clothes were no cleaner than could be expected after the rough experiences of the march and the work done in preparing the hospital. Without some clean outward garment we could not have looked for decent surgical results. Neither gloves nor gowns, I believe, are included in the equipment of any form of our hospitals in war.

One was greatly impressed with the value of skiagraphy in military surgery. Not only was time saved in diagnosis, but treatment was rendered easy and accurate by the knowledge gained by examination. Skiagrams were, of course, the more satisfactory method of obtaining pictures, but their production meant time, the possession of sufficient plates, and the means to develop them. In Kirk Kilisse we at first had no hyposulphite (by an oversight), but we also had no water laid on, and how Mr. Cox obtained the results he did is a mystery known only to himself. In Sofia, in summer, there was water laid on, but not in the developing room, only in an ablution room common to the hospital and the neighbouring camp. The result was that a permanent plate was seldom obtained. Screening was the normal mode of using the apparatus, and for most purposes it was quite satisfactory, although requiring a good deal of practice. A difficulty in using the screen is that for the thigh or pelvis tubes take some time to get sufficiently hard. In Sofia, all our tubes as unpacked were too soft for use above the knee, and it was not until after quite a week's use that they would penetrate the thigh or shoulder, and it was for these deeper regions that X-rays were most required.

#### STATISTICS.

The following statistics of the Bulgarian wounded treated in the British Red Cross Society's hospitals during the first and second Balkan Wars (Tables II and III) may be of interest, although the figures upon which they are based are too small to serve as general examples. They combine, however, the figures for a hospital for severe cases at an advanced base (the British hospital at Kirk Kilisse in the first war) with those for an ordinary hospital at the base (the British hospital at Sofia during the second war).

TABLE II.—CLASSIFICATION OF WOUNDS BY WEAPONS CAUSING THEM, B.R.C.S. HOSPITALS WITH THE BULGARIAN ARMY, FIRST AND SECOND BALKAN WARS.

	Numbers	Percentages
Small-bore bullet wounds .. .. .	304	85·6
Shrapnel bullet wounds .. .. .	35	9·9
Hand grenade bullet wounds .. .. .	9	2·5
Bayonet wounds .. .. .	1	0·3
Miscellaneous wounds (contusions, &c., not due to injury by enemy's weapons)	6	1·7
Total .. .. .	355	100

TABLE III.—CLASSIFICATION OF WOUNDS BY REGIONS, B.R.C.S. HOSPITALS WITH THE BULGARIAN ARMY, FIRST AND SECOND BALKAN WARS.

355 wounded, of whom 31 (8·7 per cent) were wounded in more than one region.

	Head	Face	Neck	Chest	Abdomen	Back and spine	Upper extremity	Lower extremity	
Flesh wounds .. .. .	4	1	1	5	2	10	7 <sup>*a</sup>	117 <sup>*e</sup>	..
With fracture of long bones	..	1 (lower jaw)	..	..	..	..	4 <sup>*b</sup>	17 <sup>*f</sup>	..
With fracture of short bones	..	1 (upper jaw)	..	..	..	..	3 <sup>*c</sup>	11 <sup>*g</sup>	..
Injuring spinal cord or large nerves	..	..	..	..	..	1	..	3 <sup>†h</sup>	..
Injuring arteries .. .. .	..	..	..	..	..	..	2 <sup>†d</sup>	5 <sup>†i</sup>	..
Penetrating and implicating contents	2	..	..	7	1	..	..	..	..
Total .. .. .	6	3	1	12	3	11	45 <sup>†</sup>	305 <sup>†</sup>	386
Percentage by regions	1·5	0·8	0·2	2·1	0·8	2·8	11·6	79·2	100

\* First Balkan War only.

† Both wars.

a 50 per cent. b 28·5 per cent. c 21·5 per cent. d 4·4 per cent. e 80·7 per cent.

f 11·7 per cent. g 7·5 per cent. h 0·9 per cent. i 1·6 per cent.

## Clinical and other Notes.

### A CASE OF HODGKIN'S DISEASE TREATED WITH SALVARSAN; RECOVERY.

BY MAJOR W. S. HARRISON.  
*Royal Army Medical Corps.*

THE patient was an officer in the Egyptian Army who had been under my care about a year previously on account of an obstinate nasopharyngitis which was accompanied by an eruption of a few slightly raised red plaques with a scaly surface; these were distributed on the upper lip and the forearms. Their chief interest in connexion with this illness lies in the fact that the condition sufficiently resembled syphilis to induce me to have the patient's serum tested for the Wassermann reaction. This, however, gave a negative result on two occasions, while cultures of the skin lesions produced a growth of a blastomycete, which was also to be seen in microscopic specimens of the scrapings from the eruption. The patient returned to the Sudan, his eruption having vanished and his nose and throat being in a tolerable condition.

In the spring of 1913 the officer was in the Sudd and got a severe wetting; shortly afterwards he began to suffer from symptoms of extreme breathlessness, so much so that he was only able to leave his chair for a few moments at a time. There was no medical man available at the time, but a doctor who saw the patient shortly afterwards, while his recollection of the attack was still fresh, gave it as his opinion that the condition was probably asthma, which in view of the patient's previous attacks of nasopharyngitis, seemed not unreasonable. The acute illness lasted about ten days, but when I saw the patient three months later he was still obviously breathless, although he himself was not conscious of it. Some three weeks after this illness the officer noticed that the glands in his neck were swollen; they were only slightly tender, and after a short time the swelling subsided, though not quite completely. A week or two later the glands again enlarged and the patient then noticed that there were swellings also in his groin; these, however, never reached any great size. The glands continued to wax and wane. But after each period of swelling they were left distinctly larger than they had been before. The general health was apparently very little disturbed, and it was only on his journey down country on his way home that he consulted a medical officer about the condition. The medical officer suspected that the case might be one of sleeping sickness, since the patient had been living in or near an infected district, and he advised him to consult me on his arrival home.

When I saw the patient in May, 1913, three months after the commencement of his illness, he was apparently in a very good general condition, with the exception of the slight breathlessness already noted, and the still persisting naso-pharyngitis, which caused a troublesome barking cough. The glands along both sterno-mastoid muscles were enlarged, forming masses varying in size from that of a pigeon's egg to a small almond. The epitrochlear glands were also distinctly palpable as well as those in the groins. There was also a mass filling up the left supra-clavicular fossa; in this the individual masses of glands were not distinguishable, the whole swelling having the feel of a soft doughy mass, filling the whole space between the posterior edge of the sterno-mastoid and the anterior edge of the trapezius. The individual masses of glands were firm, painless, and freely movable beneath the skin and between each other. Beyond a few rhonchi, there were no abnormalities to be found in the chest, though it is probable that the breathlessness was due to enlargement of the mediastinal glands. The spleen was not enlarged nor was the liver. The patient's general nutrition was good and there were no rashes on the skin. There was no fever. Examination of the blood revealed no abnormalities in either the white or red cells, and there were no parasites to be found, special attention of course being paid to the examination for trypanosomes. In view of the history gland puncture was done on two occasions, and the gland juice examined microscopically and injected into rats; the results were completely negative. Wassermann's reaction was again tried, and the opsonic index of the patient's serum with tubercle was taken in a series. The results of these examinations also threw no fresh light on the nature of the case. The patient did not react to tuberculin in doses of 1 and 5 mg. Eventually I asked Major (now Lieutenant-Colonel) E. M. Pilcher to remove one of the larger masses for examination. The mass, which on the outside appeared to be a single enlarged gland, turned out to consist of a group of glands, varying in size from that of an almond to that of a pea. Portions of the different members of the group were fixed in formol saline and embedded; at the same time an emulsion of the glands was injected into guinea-pigs as a test for tubercle, and into rats as a further test for trypanosomiasis; these animals experiments gave no results at all. Sections of the embedded material were stained in appropriate fashion and showed the characteristic changes of Hodgkin's disease. The more recently enlarged glands consisted of hyperplastic lymphoid tissue in which were embedded sharply defined masses of large endothelial cells. In places where the process was more advanced there were streaks of fibrous tissue through the lymphoid tissue. At a still further stage fibrous tissue had almost entirely replaced the lymphoid tissue, and one saw a mass of fibrous tissue in which were embedded here and there nests of endothelial cells. One of the glands seemed to have been completely changed into fibrous tissue. Eosinophile cells



were present in small numbers, but they were not nearly so numerous as I have usually found them in this condition.

There remained then the question of treatment, and in view of the fact that arsenic often seems to do, at any rate, temporary good in Hodgkin's disease, I determined to try the effect of salvarsan. The patient was accordingly given two doses of 0.3 and 0.6 grm. respectively at intervals of ten days. He then returned to his home, with instructions to carry on with Fowler's solution in gradually increasing doses, and to return in a month for a further dose of salvarsan. When he did return there was manifest improvement, the glands in the groin and the elbow were no longer palpable, while those in the neck were distinctly smaller. He received another dose of 0.6 grm. of salvarsan, and was told to return in another month, and to continue taking the Fowler's solution. When he returned the second time there were no glands to be felt in the neck or elsewhere, and the patient was in very excellent health. He showed no signs of arsenical poisoning, but in view of the long time that he had been taking the Fowler's solution in addition to the salvarsan I contented myself with repeating the dose of the latter, and advised him to discontinue the Fowler's solution. When he returned at the end of another month there were no signs whatever of his former trouble, and he was passed fit by the medical board to return to Egypt. This was in August last. Six months had elapsed since the last signs of the disease disappeared when I heard from him by letter, dated December 26, that he was in excellent health and that there had been no further enlargement of the glands.

The case is an interesting one, and suggests that salvarsan may be useful in similar circumstances. The diagnosis seems to have been put beyond all doubt, and perhaps it was fortunate for the patient that the condition was recognised at a comparatively early period of his illness. Whether or not salvarsan would be useful in more advanced stages of Hodgkin's disease remains to be seen.

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#### OUR BADGE.

BY LIEUTENANT-COLONEL S. F. CLARK.  
*Royal Army Medical Corps.*

EXCEPT for some remarks by Colonel (now Surgeon-General) T. M. Corker in 1908, no reference to our badge has appeared in the *Journal*, so possibly an account of it may be of interest.

The story of the badge takes us back to the enthralling fancies of Grecian mythology, and the tale includes some of the leading characters in those strong and virile legends. Let us begin by refreshing our memory in regard to some of them.

Zeus, whom the Romans called Jupiter, was the all-powerful head of the mythological deities. He dwelt on Mount Olympus, whose top reached the heavens, and was the ruler and father of gods and of men. He had sovereignty over the heavens and the earth, and the forces of Nature. He guided the stars and flung the lightnings about, and also controlled the happiness or misery of mortals. His brothers, Neptune, the lord of the sea, and Pluto, the king of the infernal regions, were his vassals, and his supremacy in every direction was unquestioned. To be a blood relation of this mighty being was therefore no small honour, even if the strict legality of the tie was open to question. Apollo, whose mother was Latona, was a son of the irresistible Zeus. He and his twin sister Diana were born on an island specially raised by Neptune from the bottom of the sea to serve as a refuge for Latona from the persecutions of Juno, the lawful wife of Zeus. Apollo was also a relation to be proud of, for he was the impersonation of Greek life in one of its best and most beautiful forms. He was indeed a god, for his statues combine the perfection of physical beauty with the highest and most lofty mental attributes. The nymphs were female divinities of inferior rank who inhabited the physical features of Nature. The sea, the streams, the woods, and the hills all had their quota of these captivating creatures. The centaurs are now generally represented as beings whose bodies were half man and half horse, but originally they were a race of untamed men who lived in the inaccessible places of Thessaly.

Having thus refreshed our memory on certain side issues, we come to the real hero of our tale, Æsculapius, for it is around him that our medical mythology and our badge revolve. He was of proud descent, for his grandfather was the omnipotent Zeus, his father the incomparable Apollo, and his mother the enchanting nymph Coronis. The exact place of his birth was disputed, but an oracle decided in favour of Epidaurus.

Æsculapius was educated by Chiron, the most famous of the centaurs, who lived on Mount Pelion, and who taught his pupil the arts of hunting and of healing. Chiron was accidentally killed by Hercules, but Æsculapius eventually so surpassed his teacher in medical skill that he was able to restore the dead to life. This was his undoing, however, for he raised the enmity of Pluto, the monarch of the infernal regions, who, fearing that his kingdom would get no fresh inhabitants if nobody ever died, complained to Zeus, and succeeded in poisoning his ear so much that in a fit of anger lest all men should become immortal, the great god slew Æsculapius, his own grandson, with a thunderbolt forged by Cyclops. Another version of the story is that the wrath of the great god blazed up and caused him to launch the lightning at Æsculapius because the latter had interfered with his will by putting together and restoring to life somebody who had been torn to pieces by the orders of Zeus.

Æsculapius was the medical member of the expedition of the Argonauts in its quest for the golden fleece. He had two sons, Machaon and

Podalirius, who were physicians in the Greek army that besieged Troy ; so we perceive that it is no new thing for the pick of the profession to enter the services, and to seek adventures by land and sea. The names of these sons have not lived in the way that those of their sisters, Panacea and Hygeia, have done. The last-named was the goddess of health, and we are her devoted worshippers,

Upon the death of Æsculapius the gratitude of mankind for his skill raised him to the status of the god of healing. Temples were erected to his honour in many parts of Greece, usually near high mountains or curative springs. Those who were ill flocked to these temples, and slept in them, and the god (Æsculapius) was supposed to effect cures, or prescribe remedies in dreams. Those who were cured showed their appreciation by offering sacrifices and by hanging up votive tablets which recorded their name, disease, and manner of healing. The most renowned shrine was at Epidaurus, the birthplace of Æsculapius, and every five years games and processions were held there in his honour. The fame of the medical deity eventually spread to Rome, and in 293 B.C., centuries after his death, his worship was introduced to that city by command of the Sibylline books, in order to avert a pestilence. To accomplish this the god was brought from Epidaurus in the form of a serpent, and was established in a temple on an island in the Tiber—and the pestilence was kept away.

According to ancient sculptors and artists, Æsculapius was of a fine type of manly beauty, as became his illustrious descent. He was big and strong, with hair thrown back and falling in curls on each side. He is usually shown standing up, with a long cloak thrown over him which leaves his breast bare, and by him is the club or staff with the serpent coiled round it—that is now our badge. Although we are accustomed to speak of the serpent as an emblem of wisdom, yet it is also said to be the symbol of renovation.

Serpents from time immemorial have been accredited with healing power, and they are even said to have known of a root that could bring their dead back to life. Owing to their reputation it is only natural that serpents were so closely associated with the god of medicine. They were kept and tended in the sanctuaries of Æsculapius, and extraordinary powers were ascribed to them, while many of the votive tablets found about these temples are in the form of serpents. The serpent coiled round a staff, which has been mentioned as being an attribute of Æsculapius, was for long placed at the head of prescriptions by physicians, and is universally recognized as the badge of medicine.

The laurel wreath is a mark of great distinction ; Æsculapius is sometimes depicted by the ancients with laurel bound round his head, and heroes and poets were honoured by having a crown, or wreath, of these leaves placed upon their brows. It became a symbol of triumph in both Greece and Rome, as a laural wreath was the sole reward of the victors

in the Pythian games. The plant was sacred to Apollo, and was forbidden to be employed in profane use. Our badge therefore includes the emblem of honour and distinction for which the poets, athletes, and warriors of ancient Greece and Rome contended, and which lives in the saying of "looking to one's laurels."

The imperial crown doubtless signifies the fact that we are a royal corps. Our motto is an inspiring one, and not undeserved. We may read it freely as meaning "faithful in difficulties."

It is evident, then, that the constituents of our badge are marks of honour in which we may well take pride. The imperial crown alone is a high distinction, binding us to loyalty and faithful service. The laurel wreath sets up for us a great ideal; it is the reward for which men strove and fought in the days when the world was young. The rod and serpent is the mark of one of the two honourable professions to which we belong, and except perhaps for the dragon and the sphinx there is no older badge in the Army. It was old when many a badge that is now prized and cherished was not even thought of, and it carries us far back in the mists of time to the legendary days when the sons of Æsculapius, perhaps even then using the symbol of their father, as we do now, cared for the stricken soldiers before the walls of Troy.

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### A STRETCHER BELT.

By CAPTAIN COLIN CLARKE.

*Royal Army Medical Corps.*

THE following five principles are observed in the disposition of the British infantryman's equipment:—

The weight is carried—

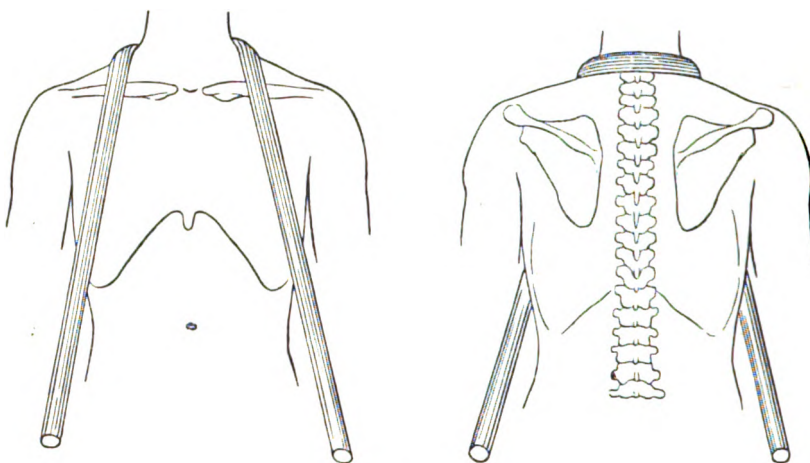
- (1) On the back, shoulders, and loins.
- (2) Close to the centre of gravity of the body.
- (3) With many points of support.
- (4) Without pressure on the chest.
- (5) With no constriction of blood-vessels and nerves.

These principles are the outcome of many years of practical experience, and the closer any equipment conforms to them the greater is the ease and comfort of the soldier.

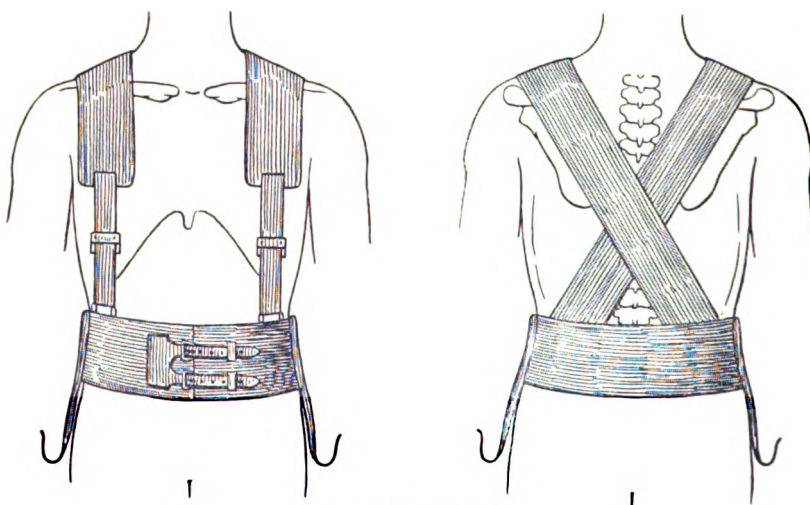
The service stretcher sling represents an almost complete disregard for all these principles. It places the weight—

- (1) On the back of the neck.
- (2) High above the centre of gravity of the body.
- (3) Concentrated on the neck.
- (4) Pressing on the front of the chest.
- (5) Constricting the blood-vessels and nerves at the root of the neck.

The narrow stretcher sling is galling, and to relieve their necks, the stretcher bearers carry most of the weight with their hands. Six bearers are allotted to each stretcher squad, and when carrying wounded, frequent changes of the bearers are necessary owing to fatigue.



THE STRETCHER SLING.



THE STRETCHER BELT.

An eleven-stone man lying on a stretcher represents a total weight of 184 lb. to be carried, that is, roughly, 92 lb. at each end of the stretcher. This 92 lb. is not an excessive weight, for according to Kirschner, the German infantry soldier in 1893 carried over 71 lb. in marching order.



The great fatigue caused by stretcher bearing is chiefly due to the way in which the stretcher is carried. If the weight of the loaded stretcher were distributed over the shoulders, backs, and loins of the bearers by means of a broad webbing equipment, the fatigue of stretcher bearing would be greatly reduced. With such an equipment three bearers would be sufficient to carry a stretcher in place of the present six.

In order to test this theory, Colonel Bunny, A.O.D., very kindly gave permission for two web stretcher belts to be made in the ordnance department at Malta, on the same principles as the British soldier's web equipment. The stretcher belt, which is worn quite loose round the waist, is much more comfortable than the ordinary stretcher sling, and can be worn as part of the stretcher bearer's equipment. During carriage the handles of the stretcher rest in hooks, which are attached to the sides of the belt by means of webbing, and hang just below the level of the great trochanter of the femur on each side. The hooks fit loosely to the narrow part of the stretcher handle, but cannot be pulled off the enlarged rounded ends.

The advantages claimed for the stretcher belt are :—

The weight of the stretcher is placed—

- (1) On the back, shoulders, and loins.
- (2) Close to the centre of gravity of the body.
- (3) With a wide area of support.
- (4) Without pressure on the chest, or respiratory interference.
- (5) With no constriction of blood-vessels or nerves.

With this stretcher belt the arms, neck, and chest of the bearer are remarkably free, and three bearers are quite sufficient for the carriage of a wounded man and his equipment.

At Cottonera, Malta, three stretcher bearers, using this stretcher belt, carried a man weighing 11 st. 6 lb. half a mile in fourteen minutes, and one mile in twenty-nine and a half minutes, without any difficulty.

The belts are made of Indian tent webbing, costing one penny per yard. Each belt costs half a crown to make in Malta, namely, one and six for webbing, straps, hooks, &c., and a shilling for labour. The weight of each belt is 1 lb. 4 oz.

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#### A CASE OF BERI-BERI COMPLICATED BY DUODENAL ULCER.

BY CAPTAIN E. M. MIDDLETON.  
*Royal Army Medical Corps.*

SAPPER W. was admitted to hospital at Fort Pitt on January 19, 1914, from Christmas furlough, complaining of extreme weakness, abdominal pain, and vomiting. The previous history of the case obtained from his medical history sheet and supplemented by himself is as follows :—

At Dover, in April, 1912, he was admitted to hospital for nineteen

days with "indigestion," when he complained of abdominal pain and constipation. In May of the same year he was again admitted with the same thing, his stay in hospital being thirty-seven days, and it was then noted that he had dilatation of the stomach.

In September of the same year he was admitted at Fort Pitt with "appendicitis." He then stated that for three years he had suffered from indigestion and vomiting which occurred chiefly in the evening and early morning. On the morning of the day of admission, after a light breakfast, he had an acute attack of pain which he described as "drawing and shooting," and indicated its situation as being over the right side of the abdomen from the epigastrium to the iliac region. His condition was one of collapse, skin cold and damp, temperature 98° F., pulse 100, abdomen distended, the distension being especially marked in the hypogastrium, no movement on respiration, tenderness and rigidity mostly on the right side. He vomited in the evening, and appeared easier afterwards. Next day his temperature was 101° and pulse 100, and he appeared easier. A consultation was held, and it was decided that the symptoms were not definite enough for immediate operation as the abdominal pain was still very diffuse. Next day, the 16th, his temperature was 99° and pulse 108, the abdomen slightly more distended, and the liver dullness replaced by resonance. Pain was still recurrent. Another consultation was held, and a laparotomy decided upon as the case was considered one of acute appendicitis.

The operation showed a largely distended, red, and injected intestine which, when punctured, allowed a large amount of gas to escape. About half a pint of very turbid fluid was present in the peritoneal cavity. The appendix was kinked and bound down, and when removed and opened two large ulcers of the mucous membrane were found. The abdominal wound closed up by the 30th, and he was discharged from hospital to furlough on October 10.

At the termination of two months' furlough he was sent to Sierra Leone. Six weeks after arrival, he was admitted with "beri-beri," and invalided home after forty-one days in hospital. After two months' furlough he was admitted to hospital at Woolwich, and his medical history sheet states that he had no symptoms beyond loss of patellar reflexes. He was brought before a board, and found fit for duty, and returned to duty at Dover until just before Christmas, when he went on furlough. During his stay in Dover, he stated that he was still weak and subject to pains between the shoulders and under the shoulder-blades. These attacks of pain would be accompanied by vomiting, which gave relief. Just previous to admission, while on furlough, his diet had been mainly milk and water, as he was still subject to pains in the chest. During the last few days he had had severe attacks of vomiting, the vomit being black in colour. He admitted that his diet had been increased.

On admission his skin was wax-like, the mucous membranes almost

colourless, conjunctivæ bright and clear, tongue furred, temperature normal. Heart: Apex beat in fourth interspace, just internal to the mammary line, forcible in character; pulmonary second sound reduplicated; no murmurs. Stomach: Much dilated, upper limit on percussion found at fifth rib. Abdomen: Distended and tympanitic. Lungs: Breath sounds normal. Nervous System: Left pupil reacted to light and for accommodation, right pupil reacted for accommodation, but sluggishly to light; knee jerks absent; sensation normal, no ankle clonus. Muscles everywhere much wasted; no tenderness.

Progress was excellent until the 23rd, when he had a severe attack of pain accompanied by vomiting. Discomfort lasted three or four days, when he again showed signs of improvement, until on the 29th he had a severe hæmorrhage of about a quart of blood from the stomach. The vomit had been very slightly acted on by digestive juices. Under morphia and saline infusions he improved considerably. Next day he vomited another quart of blood. Saline infusions were given off and on all day, and up to the time of his death at 2.30 a.m.

*Post-mortem.*—About half a pint of blackish-green fluid was found in the abdominal cavity. The omentum was destitute of fat, and adherent to the abdominal wall. The small intestine was adherent to the old laparotomy scar. The stomach was greatly enlarged, thickened, and dilated; the pylorus thickened, and forming an adherent mass with the head of the pancreas and the transverse colon. The tissues around were stained by the intestinal contents. Nothing was found on opening the stomach. The duodenum was defined and removed with difficulty, and an ulcer was found at the mouth of the pylorus which had recently perforated. The mucous membrane presented punctiform hæmorrhages over the whole of its surface. The heart was enlarged, and the right side dilated. The lungs were œdematous, and the pleuræ everywhere adherent.

I am indebted to Captain H. T. Wilson, R.A.M.C., who operated on the patient for appendicitis, for his notes of the case.

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#### A CASE OF GANGRENOUS OVARIAN CYST.

BY MAJOR A. J. CHAMBERS.

*Royal Army Medical Corps.*

*(Retired Pay.)*

Mrs. B., aged 38, was admitted to the Victoria Nursing Home, Lichfield, on December 28, with symptoms of general peritonitis. She had been confined six weeks previously, and since that date had experienced pain in the lower part of the abdomen, but had not applied for treatment. About seventy-four hours before admission she was seized with sudden, intense pain in the right iliac region, accompanied with a rigor and vomiting.

On admission she was in a semi-collapsed condition; pulse 140, scarcely perceptible; temperature 102° F. The abdomen was greatly distended and dull to percussion. Pain was severe and general, but most marked in the right iliac region where there was considerable rigidity.

Operation being decided upon, this was performed by Mr. Seymour Barling of Birmingham. The incision was made through the sheath of the rectus muscle. On opening the peritoneum a quantity of most offensive fluid escaped, and signs of peritonitis were evident. On inserting the fingers a large mass was discovered to the right of the uterus, which proved to be a gangrenous ovarian cyst measuring four inches in its longest diameter. This, together with the Fallopian tube, was removed and a large drainage tube inserted into Douglas' pouch. The patient was put to bed in Fowler's position, and saline injections and turpentine enemata administered. Unfortunately the heart refused to respond to stimulation and the case terminated fatally thirty hours after operation.

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## Sport.

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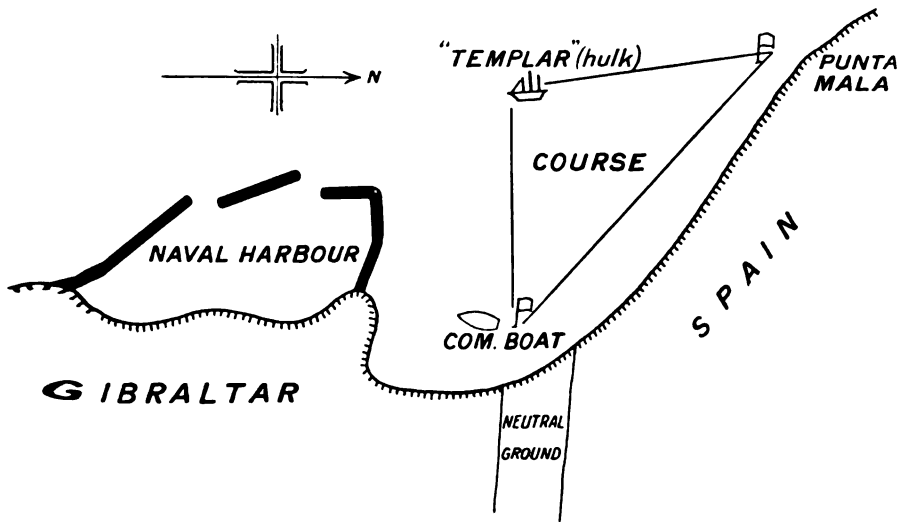
### YACHTING AT GIBRALTAR.

BY MAJOR C. R. L. RONAYNE.

*Royal Army Medical Corps.*

LOOKING through the "Editorial Notices" of the Journal I see that contributions are invited, not only on professional matters but on quite a variety of subjects. Perhaps, then, an account of my yacht "Wasp" and two years' racing with her under the auspices of the Gibraltar Yacht Club may prove interesting. In our school days we learned all about Gibraltar, its sieges, fortifications, &c., I therefore do not intend to bore the reader with a description of what he already knows. But the bay and harbour are, perhaps, not so well known, and as it was in these waters the "Wasp" cruised and raced, a description of them will, I think, not be amiss. The Bay of Gibraltar is circular and of even contour, forming about two-thirds of a circle; its entrance faces due south. It has a diameter of about five miles. The entrance on both sides is rocky, the rocks extending for some distance inwards, but by far the greater part of the coast is of shelving sand. There is good depth of water everywhere, so that it is possible to sail round the whole bay within a few yards of the shore. Tides do not run strong, as compared with those of home waters, still they are strong enough, and very

“tricky” from a racing point of view. Across the bay facing Gibraltar and nestling picturesquely beneath the Sierra de Algeciras hills is the Spanish town Algeciras. Here in A.D. 711 the haughty Moors made their first conquest and from thence marched triumphant through Southern Spain; and here too by the irony of fate, in 1906 the Powers in conference dictated to the Moors how they should conduct their affairs—not in Spain but in their native Morocco! About a mile to the south of Algeciras is a sheltered cove called Getares Bay, but popularly known as “Sandy Bay.” Its fine beach and beautiful clear waters make it an ideal place to



SCALE. 1 INCH = ABOUT 1 MILE

“bask in the glare or stem the tepid wave,” and for this, it is much patronized by picnic parties from the Rock during the summer months. Rumour has it that “Sandy Bay” is a “coming” place; that a syndicate is about to build palatial hotels, villas, and casinos, in short, make it a Monte Carlo. Two small rivers run into the north of the bay—the Palmones is navigable in yachts for about a mile—but on the whole they are better known to hunters of the wily “zorro” (fox) than to yachtsmen.

So much for a general description of the bay; and now to come to the vicinity of the Rock. The naval harbour in which the warships moor was built only recently, is formed by massive sea-walls



called "moles" (*see sketch*). To the north of it lies the commercial harbour, or, as it is called, North Front. Here there is a considerable traffic of small steamers and barges going to and fro to the different liners that call; also many native vessels (feluccas) bring wine and fruit from Ceuta and other neighbouring ports. Here too are moored about fifty dismantled ships known as "the hulks" (the "Templar" seen in a snap-shot affords a good example of a "hulk"); unfortunately they are not located in one spot, but are "all over the shop," and as they throw a "blanket" a considerable distance they are often the cause of much anxiety to helmsmen when racing. They are chiefly used for storing coal. The races are held at North Front over a triangular course (*see sketch*). Three rounds are usually completed, unless the wind is light, a distance of about twelve miles.

As regards the wind and weather experienced at Gibraltar, it scarcely ever blows from due north or south, but it blows from every other quarter, there being no prevailing wind. If it comes at all fresh from the east the "levante" puffs that strike down from the Rock are of hurricane force and most dangerous, but once clear of the Rock, as at North Front, the wind is true and steady. During the summer months it often blows freshly from the south-west or north-west and causes a goodish sea outside the Moles and at North Front. There is no rain from May until about the end of October. During the winter it rains heavily for several days, followed by intervals of fine weather. The heat during the summer is never a "knock out" heat, like for instance that experienced in India, whilst even in the hottest months cool breezes from the west often temper the sun's rays. In the winter the weather is fresh and bracing, but there is no real cold. Taken all round, the climate is equable and ideal; and the same can be said of all Southern Spain. Contrast this with our own "wretched climate" and then read Byron's lines in "The Traveller":—

"The patriot boasts where 'er he roam  
His first, best country ever is at home;  
And yet, perhaps, if countries we compare  
And estimate the blessings which they share,  
Though patriots flatter still shall Nature find  
An equal portion dealt to all mankind,  
As different good by art of Nature given  
To different nations makes their blessings even."

I arrived at Gibraltar in September, 1910, for a tour of duty, and as I have always been keen on sailing I lost no

time in looking round for a yacht. There were at that time three in the market; the "Dingbat," "Larkspur," and "Wasp." The "Dingbat" was a 6-tonner, a fine roomy weatherly boat, with a good turn of speed and sound as a bell. She was just what I wanted, so I went to £10 more than I thought she was worth, but as the owner wanted another £10 no business was done. The "Larkspur" was a beautiful model, but she was a racing machine pure and simple, and with her 4 ft. 6 in. beam was wet in a sea-way, and most uncomfortable for cruising; so she was not what I wanted. As regards the "Wasp," I had heard she was a centre-board yacht, and this alone was enough to put me off, so I did not trouble even to look at her. I then wrote to a friend in England to try to get me a yacht, and send her out on a steamer. But months went by and nothing turned up, so I thought I might as well have a look at the "Wasp." I was agreeably surprised to find that she was roomy, and evidently a good sea-boat and fast. She was sloop-rigged, 24 ft. 6 in. L.O.A., 6 ft. 6 in. beam, and draught 2 ft. 3 in. She had about a ton of lead on the keel, and the centre-board passed through a slot in the lead. An attack on her with a pen-knife and a marlin spike proved her to be quite sound, though she was an old boat, and had been in Gibraltar for about fifteen years. After some bargaining I bought her. But then there was the problem of removing her centre-board and putting on a keel. Friends shook their heads and said I was going to spoil her. However I decided to make the alteration; so I had the centre-board casing removed and the lead taken off; the slot in the lead for the centre-board was filled with lead (it took 1 cwt.). Strengthening ribs were added inside; and outside a solid oak keel (1 ft. deep aft and 9 in. forward) was fixed on. This keel corresponded in measurements to the original lead which was now bolted on to it, the bolts were passed up and nutted on a keelson running along the ribs. A piece of dead-wood was added forward to carry the curve of the fore-foot. Ring-bolts to sling her on a crane for cleaning, &c., were not forgotten—a most important point in Gibraltar, as the difference between high and low water is only about four feet. The alterations greatly improved her, and she has turned out a fine stiff sea yacht, with an increased turn of speed, as her record shows. The sails I ordered from Laphorn were of the same area as the old ones, but she is now rather under-canvassed in light weather. However, this is a defect that can be easily put right with the next suit.

Thus, on May 3, 1912, the "Wasp" once again took the water, but this time in a completely altered condition. She was rigged next day and got ready for the opening cruise, to which I will refer again presently.

The Gibraltar Yacht Club was founded on October 22, 1837. It was entitled by Admiralty warrant to fly the White Ensign, but the privilege was withdrawn on July 22, 1842, and the Blue Ensign substituted. H.M. The King is patron. The club is recognized by the Yacht Racing Association. The season opens each year with a cruise to Algeiras. Naturally the success or otherwise of the



The "Wasp."

cruise greatly depends on the weather conditions, although want of wind has not now the complete spoiling effect it used sometimes to have in former years, as quite a number of members have motor yachts ready to give a friendly tow in case of necessity. Anyway the opening cruise of 1912 was a great success. The rendezvous was off the North Mole, where fourteen yachts put in an appearance, and at a given signal from the commodore we started. There was a nice whole-sail breeze from the south-south-west, so that with sails sheeted home we were just able to lie our course, and fetched up Algeiras about one o'clock, after a topping fine sail. Nothing could exceed the appetites we picked up on the voyage, so we were able to do full justice to the excellent lunch that awaited us in the ball-room of the Reina Cristina Hotel, where places were

laid for forty at one long table. At lunch we drank toasts and cracked jokes, and altogether the time went with a swing. After lunch we adjourned to the hotel gardens, where under the orange-trees we smoked and sipped coffee and liqueurs, then to the neighbouring casino, where various "infallible systems" were set in motion, with the infallible result that many of us came away with less "ballast" in our pockets. About 6 o'clock we got under way again. The wind had held steady, and with eased sheets we made a quick passage and arrived at Gibraltar about sunset. So ended a most enjoyable day, and one that well deserved to be recorded in red-letters in the annals of the Gibraltar Yachting Club.

Racing commences soon after the opening cruise. There are races for "A" class and "B" class yachts, but as "Wasp" belonged to "A," in future I shall refer only to this class. The racing is held on Saturday afternoons; and marks are allotted as follows: win = 5; 2nd = 3; 3rd = 2, whilst to complete the course properly = 1. Cups are sailed for, and there are usually several races for each cup, the yacht with the most number of marks being the winner. The racing is handicap, and there are three scales of handicap to suit the different weather conditions, thus: "strong west," "strong east," and "light weather"—in light weather all sail scratch. "Wasp" was to sail under her old handicap; that meant she gave time to all, with the exception of "Rosalind," which gave her half a minute per round. The first of nine races for the Admiral's Cup took place on May 11. An account of a race in the papers next day is very interesting to all who took part in it, but it is usually rather dry reading for anybody else. I shall not therefore give details of each race, but refer only to some, and to incidents that took place during the season. The first race proved rather auspicious for "Wasp." Though she did not win it she finished first and failed only by twenty-one seconds to give "Dingbat" her allowance, and so had to be content with second place. But next week was by no means so auspicious; one of my crew managed to drop overboard and consequently "Wasp" was unplaced.

Racing was uneventful until the seventh race, when we had an annoying experience. The wind was light and fluky throughout the day, but "Wasp" had managed to get within about 100 yards of the finishing line, whilst all the other yachts were at least half a mile behind. We were just counting the race as finished—"bar the shouting," when suddenly the wind failed, and left us helplessly

becalmed. Meantime the others had picked up a breeze, and along they came with a rush. When the gun went, "Wasp's" bowsprit was well over the counter of the winner, and yet she was only third!—because unfortunately there was another bowsprit just about two feet in front of "Wasp's." A truly wonderful and exasperating finish!

The eighth race was sailed in a fine westerly breeze, and "Wasp" won it by the narrow margin of seventeen seconds from "Lassie." She now required only one mark to make sure of winning the Admiral's Cup, and this she secured the following week.

We were now about to begin a series of ten races for the King's Cup, and the first race took place on Saturday, August 3. There was a nice breeze from the south-west, but in trying to pinch round the "Templar," "Wasp" fouled it, and so had to retire.

The following Saturday there was a light easterly breeze, and she won. Next day (Sunday) I saw from the hospital grounds that she was not at her moorings (she was moored in the naval harbour). I was not alarmed, but rather displeased, as I thought somebody had taken advantage of the fact that I was on "orderly duty," and had gone for a sail in her. But evening came on and she had not returned, so I rang up the dockyard police. I was informed that she had not been at her moorings since 7 a.m., and incidentally that two seamen, a dinghy, clothes, rifles, and ammunition had been reported as missing from one of the war-ships. I immediately feared the worst. "My goodness!" thought I, "the last of the 'Wasp'! By now probably abandoned and in bits on some rocky coast." Next day I telegraphed to all the neighbouring ports, and the hue and cry was out for the seamen. But there was no trace of men or yacht. A beautiful Spanish girl was reported missing from her home, and she, too, was aboard the lugger (as it afterwards turned out). Real romance!—at least so everybody said, though personally I could not see a trace of romance in the whole wretched affair. The next day my brother arrived from England for a month's cruising and racing in the "Wasp," and the same day came information from the Spanish authorities that she was ashore and wrecked west of Tarifa, and the seamen captured. A torpedo-boat was going round, and permission was very kindly granted me to go and to bring some help. We found her about thirty-five miles west of Gibraltar in a lonely cove, half buried in sand. She was badly damaged, as she had evidently bumped along over submerged rocks. She had thirteen ribs broken on the port side and four on the starboard. Some of the seams of the planks were gaping badly, though,



strangely enough, no planks were broken. The lead also was damaged. The sails had been removed and well cared for by the Spanish authorities.

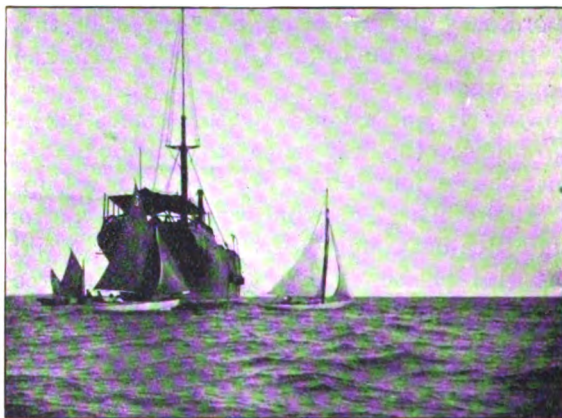
It was problematic whether she could be patched up and towed back—but nothing venture, nothing win! So we got to work with tools and timber we had brought, and were soon shaping out rough ribs and planking. Putty and caulking had not been forgotten, and were used liberally. After some hours we floated her successfully, and began towing. It was necessary to stop a few times to bale her out, but eventually we arrived safely at Gibraltar.

Three races had by now been sailed for the King's Cup; "Wasp" had won one, but in the other two she had not scored even a point; so no time was to be lost if she was to make any "show." The shipwright at North Front undertook to have her ready in time for the fourth race. He made a most excellent job of her, and launched her on Friday. Rigging and bending the sails did not take long, and next day she won a remarkable race. On each round I sailed her outside all the "hulks," thereby nearly doubling the ordinary distance of the course, and by this manoeuvre literally left the rest standing, all except "Larkspur," which followed in our wake.

The following is an account of this race taken from the *Gibraltar Chronicle*; the reference to those that gave up is amusingly put: "The fourth race for the King's Cup was sailed on Saturday, August 24. The wind was southerly, strong at times near the Committee-boat, but entirely fluky and variable outside. Everyone was glad to see 'Wasp' again after her recent adventures, and Major Ronayne is to be congratulated on his sportsman-like efforts to have her ready to race on the 24th. The start was a pretty one, 'Asthore' getting away three seconds after the gun, with 'Wasp,' 'Rosalind,' and 'Larkspur' close astern. 'Asthore' led till they were close to Punta Mala, when the wind headed them. 'Larkspur's' crew apparently took no notice of the change of wind and lost a lot of ground. It will be seen later, however, that they were fortunate. 'Rosalind' and 'Asthore' were soon in trouble in a series of flat calms among the hulks, where 'Buccaneer' joined them. 'Wasp' went to the westward and picked up a streak of wind which she carried to the 'Templar,' and 'Larkspur' some distance behind noticing this manoeuvre followed her. The first round ended with 'Wasp' and 'Larkspur' some seventeen minutes ahead of the others. The two leading boats managed to keep the wind with them all the evening,

while the others were in never-failing trouble as soon as they were anywhere in the neighbourhood of the hulks. However, 'Asthere,' 'Rosalind' and 'Buccaneer' had a good but somewhat exasperating race for third place. In the last round 'Asthere' gave up the unequal struggle with the hulks and stood off to the eastward, with the result that a friendly light air just dragged her round the 'Templar' and she was able to finish. The other two were last seen proceeding stern first in a northerly direction through the hulks, and they are said to have reached their moorings at a late hour."

Yacht	Owner	TIMES					
		Start			Finish		
		h.	m.	s.	h.	m.	s.
"Wasp" ..	Major Ronayne, R.A.M.C.	..	3	0	5	..	5 14 10
"Larkspur" ..	Lieutenant Farquhar, R.N.	..	3	0	16	..	5 20 25
"Asthere" ..	Lieutenant Cherry, R.A.	..	3	0	3	..	6 0 53
"Rosalind" ..	Officers, R.E. ..	..	3	0	7	..	} Gave up
"Buccaneer" ..	L. Trimby, Esq. ..	..	3	4	51	..	



Rounding the "Templar." From left to right: "Rosalind," "Buccaneer."

By winning this race "Wasp" had wiped out her deficit, and was now in the running for the Cup. The next few races were keenly contested, but nothing of note occurred until the seventh, when once again "Wasp" nearly had an end put to her career. She was passing close to "Rosalind"; "Rosalind" was to weather of her, and on the starboard tack. "Wasp" was close under "Rosalind's" lee, and on the port tack. Both were close-hauled and taking plenty of weather helm in the strong nor'-wester

breeze. I gave the helm a little extra pull in order to clear "Rosalind," when snap it went in my hand; it had broken off short, so she was completely out of control. "Wasp" immediately flew to with tremendous pace. Would "Rosalind" shoot clear in time? The suspense while it lasted was intense. "Rosalind" could do nothing, as everything happened in much less time than it takes to write it. I myself was busy getting back into the yacht as I went partly overboard, tiller in hand. An effort was made to ease our main sheet but there was really no time. However, fortunately "Wasp" missed "Rosalind's" hull by inches, but she caught her jigger and tore it clean out. Had she struck her on the hull, both would undoubtedly have been sunk, as "Wasp" with her straight stem would never have slid up on the deck of "Rosalind," as sometimes happens with the modern spoon-bow. I remember such an incident occurring some sixteen years ago in a race at the Youghal regatta. I was one of the crew of the "Elsie," one of the well-known Cork Harbour one-design class. We were beating up the harbour in a strong northerly wind, when another boat of the same class (if I remember rightly, the "Maureen") ran into us with great force, and slid right up on our deck. It was awe-inspiring to see her towering over us, next moment about to crash down and crush us. We were praying that death may be as painless as possible in the circumstances, when suddenly she disappeared as quickly as she came; she simply slid back into the sea and was soon several yards clear of us. "Elsie" had a couple of planks and some of her decking cut through, but the other appeared uninjured.

The final for the cup was full of excitement and interest—at least for the owners of "Rosalind," "Buccaneer," and "Wasp," as the points scored by them were very level. One's diary is always terse and to the point, so let me quote from my entry. Thus: "8th Oct. To-day, final for King's Cup. 'Wasp' and 'Rosalind' each = 22 marks, 'Buc.' 23. We have all been beached for the occasion. Had Huppler and Lt. G. as crew. 'Rosalind' led for the first round, at end of which when running free she luffed me severely, but shot past and never lost the lead, winning from her by 1 m. 10 sec. Wind strong W. Hard sailing all day. I am now 2 cups up. Good biz!"

All races are started from the Committee-boat. She is an old dismantled ship, and though she serves her purpose well she is normally gloomy and forbidding to look at; but once a year she appears in her "Sunday best," and then looks very gay and



Manœuvring before the start. From left to right: "Asthore," "Rosalind."  
The Committee-boat can be seen on extreme right.



Manœuvring before the start. "Spalpeen."  
The Committee-boat can be seen on extreme right.

picturesque dressed in bunting and awnings, and with a crowd of the fair sex promenading her decks. This was how she looked on October 12, when we had our annual regatta.

There were races for motor-yachts, "native" yachts, and for "A" and "B" class yachts. The day was an ideal one from a promenading point of view, but for yachting simply disastrous, with the result that "Wasp" wound up an otherwise successful season by ignominiously finishing under "timber topsails"—the euphemistic name given by sailors to oars. In other words, the calm was so hopeless she could not get round, and we had to row her back to the Committee-boat, where the cups and prizes were presented. The race was for the Gibraltar Yachting Club Cup, and was won by "Asthore," a graceful light-weather boat, whose owner seems to have a knack of "getting a move out of her" even when it blows a flat calm.

No matter what his reputation as a yachtsman, I am always suspicious about the worth of a man who comes aboard a small yacht in a well-cut coat and a knife-edge crease in his trousers—a not unfamiliar sight in these dressy days! I always feel inclined to tip my cap in gratitude should he offer to pull a rope, or apologize if a drop of spray should chance to alight on his lavender socks. Anyway, "West End" is not the kit of the practical yachtsman who is accustomed to briny "dustings." But there may be exceptions. And I thought the regatta-day would be one for me, as I had to go on board the Committee-boat to receive the Cups from the Commodore (Admiral P.). I therefore dressed for the occasion, and had no difficulty in keeping dry and clean while drifting in the calm. But, alas! on stepping on to the Committee-boat I tripped over a rope and fell into the sea, and arrived on board looking like a half-drowned rat. Alas, too! for my "West End" suit and my watch! However, the latter was one of the kind I always carry when yachting, and cost only 5s. These cheap watches, as a rule, keep excellent time, and if damaged by water or broken (as they are very likely to be in small yachts) the loss is not heavy.

I once used a stop-watch in timing the start of a race, but not being accustomed to the large hand it puzzled me more than assisted, so I never gave it another trial and always use an ordinary watch for starting, and find it quite good enough. During the past three years I have lost or had damaged beyond repair no fewer than four watches, which would work out at a pretty stiff bill if they were at all valuable. I lost the last one only quite

recently—I was lying on my back on the deck, basking in the sun. Captain D. who was steering was telling a good story about how he was trying to sail the “Larkspur” out of a dock, and how after twenty minutes’ hard sailing but without moving he discovered she was caught in a rope. He had me in such roars of laughter that gradually the watch worked out of my pocket; though I was not quick enough to catch it I had the satisfaction of touching it before it went overboard. By the way, it is remarkable the length of time a watch may be seen as it descends through clear water; for fully five minutes it keeps glittering and flashing. If the reader has any doubt about the length of time it can be seen he can easily test for himself. Of course the time would vary somewhat with the kind of watch. Good silver may be expected to flash longer than nickel-plate, whilst even the best gun-metal is soon lost to view.

Talking of lying on the deck reminds me that so far I have referred only to racing, but the “Wasp” afforded much pleasure besides, as a few entries taken at random from my diary will show. Thus: “June 9. Went aboard with Captain C. at 10 a.m. ‘Asthore,’ ‘Lassie,’ and ‘Wasp’ started about 10.30 (we towing the punt). ‘A.’ and ‘L.’ went on the starboard tack whilst we went north, and on the next leg got ‘Sandy Bay,’ where we found ‘A.’ and ‘L.’ already anchored. Anchored in close company. Lunch, bathing, &c., a fine west breeze and a grand day.’

“July 21. Sailing with Major C. Lot of wind and sea. Lunched at mouth of Palmones, but too much sea, so shifted to Algeciras and made tea there in company with ‘Lassie.’ Had two reefs in and a splendid day. Wind strong west.

“September 16. Sailing with E., Captain L. and Captain E. Had lines out for ‘bonitos’ but caught nothing, so went into Rosia Bay, tied on to the quay and made tea on board. Nice breeze south. Very pleasant.”

The regatta marks the end of the season, so “Wasp” was soon afterwards beached at North Front and allowed to remain in the open until the rain had washed out all traces of salt; she was then put into an airy shed. During the winter old paint was removed and she was re-painted inside and out. As regards painting, a patent enamel is probably the best for the top sides, or wherever effect is required, but for preservation purposes it is better to mix one’s own paint. Ready-made paint contains too much turpentine, it dries too quickly, and does not seem to have the grip and elasticity of that freshly mixed. Chancellor’s Vellure



enamel is excellent stuff for the sides, but take my advice and do not put it on the deck. "Wasp's" deck is now dangerously slippery when wet, the result of a coat of Vellure. By the way, I mixed some surplus Vellure with boiled linseed-oil and painted it on unbleached calico; the result is an excellent sail-cover, absolutely waterproof, and does not stick. I gave only one coat of the mixture.

Apropos of painting and the care of yachts it may be asked, "What is the best book on yachting?" Personally, I do not know of any really good book. Dixon Kemp's Manual is, I think, the best; but it is very bulky, and costs 24s. All the books that I know of contain too much "padding" and extraneous matter in proportion to the amount of useful information given. My idea of a good book would be somewhat as follows: It would contain diagrams of the different kinds of yachts in general use, and also enlarged sections of the different parts of a yacht; for example, the foot of the mast would be given, and every cringle and rope, &c., would be numbered and named, and so on for different parts of the yacht.

There would be a chapter on seamanship and one on racing, such as those in Dixon Kemp's book, or in "The Complete Yachtsman." These would be the only chapters; all other information would be contained in a "dictionary of general information" such as that in Dixon Kemp's, only more extensive. For example, concise information would be given on: How to "vet" a boat; all about ropes, strength, suitability, &c.; "tips" on the price of lead, the opportunities or difficulties of selling it; the average daily consumption of oil by a "Primus" on a single-hander; and information and "tips" on a host of other subjects, many apparently small, but really of much practical importance. A book on the above lines, of handy size, and costing about 10s. ought to sell like hot cakes. But I am afraid we are now cruising in other waters. Let's get back to Gibraltar and the "Wasp."

The winter being over, the season of 1913 was about to commence, so we were all busy getting ready for the opening cruise. It took place on May 11.

In light airs from the east we struggled to get to the rendezvous, and things were looking pretty black, when suddenly a nice breeze sprang up, and with spinnakers set we made a quick passage to Algeciras. A description of the day will not be necessary, suffice it to say it was practically identical with that of 1912, and so another "red-letter" day.

"Wasp" had a minute per round added to her handicap of last year, which meant that she was now scratch boat, and gave the "Rosalind" half a minute per round instead of receiving it as formerly.

The first of nine races for the Forestier-Walker Cup took place on May 17. In a light wind from the west "Wasp" pulled off a "third."

On May 31 we had an exciting time. It blew a young gale from the north-west. Most of the yachts were half smothered in the sea, and indeed "Wasp," with her coamings awash and throwing clouds of spray, was not much better off. However, she was working out a useful lead.

We had rounded the Punta Mala mark, and with eased sheet were reaching across to the "Templar" well ahead of the rest, when "Spalpeen" was swamped. We were too far off to render assistance, but came about as "Buccaneer" was also in distress, having sprung her mast. The race was then abandoned. Most of the other races were sailed in good breezes, and there were several close and exciting finishes, but otherwise nothing very particular to record. "Wasp" sailed well throughout—no doubt a good deal due to the care bestowed on her during the winter months, and notwithstanding her increased handicap, she succeeded in "lifting" this Cup.

On July 26 we began a series of nine races for the King's Cup, but before they began, another minute per round was pushed on to "Wasp's" already heavy handicap. Looking through my diary I see that these races provided many exciting luffing matches, "jockeyings," and close finishes, but I refrain from giving details lest they may bore the reader. "Larkspur" was sailed consistently well throughout the series, and won the Cup. *En passant*, she is now on the scrap heap, as she recently broke from her moorings during a gale and was pounded to bits against the Mole.

The first of five races for the Gibraltar Yachting Club Cup began on September 27. In this race "Wasp" was becalmed near the "Templar." It was exasperating the way inch by inch we closed in on the hulk, powerless to do anything except dodge the boom as it banged about—now only two inches off! Will a friendly puff or current pull us clear? No such luck! Bump, and we are disqualified!

"Wasp" won the next race by the narrow margin of thirteen seconds.

Saturday, October 25, was the final for this Cup, and also was the

Regatta-day; in addition to the Cup (which might have been won or "dead-heated" by certain boats getting "placed"), there was a special prize (silver cigarette-box) for the winner of the race. "Wasp" had already piled up such a useful score (in spite of her heavy handicap) that all she wanted was second place to make sure of the Cup.

At two o'clock we slipped our moorings and got under way. Great lumps of bunting hung on the Committee-boat, and through the mist large rat-like forms could be seen crawling up her sides and about the deck, which on closer inspection turned out to be men wrapped in "Burberrys." The rain came down in thick straight rods (I nearly said "solid" rods), whilst the calm that



Cups and Prize won by "Wasp" in Seasons 1912-13. Reading from left to right : Forestier-Walker, King's, Admiral's, Cigarette Box, and G.Y.C. Cup.

reigned was as flat as boiled champagne. A council of war was in progress as to what should be done, when just then a zephyr came out of the east, and as it soon developed into a nice little breeze we decided to "carry on." Later on a rift appeared in the clouds and the weather cleared, and it turned out favourable for sailing, though the day was by then spoilt from a social point of view.

A good start was made in the race and we ran with spinnakers set to Punta Mala and then reached across to the "Templar." As soon as we rounded the "Templar" and came on the wind I threw "Wasp" round, and on the starboard tack stood over for the Spanish shore. All the others kept on the port tack and beat up along the Mole.

Experience teaches that these different tactics often lead to widely different results, but the yachts get so far apart that it is impossible to give even a guess at what the result will be until the mark is reached. The time then was an anxious one on board the "Wasp." All alone in her tactics, was she to be "left standing," and the others round the mark streets ahead of her? The opposite was the case. She rounded the Committee-boat mark with a long lead, and was never afterwards seriously pressed, and eventually won by over four minutes, this winning both the Gibraltar Yacht Club Cup and the special prize.

The race for the Gibraltar Yacht Club in 1912 was sailed in a calm, and so was hardly a test. If this race is excluded, "Wasp" has won five out of a possible six prizes. Most of the cups are "challenge" ones, and so retained only for a year, but a silver model (to be retained) is given each time a cup is won.

Private P. Whidden of the Corps is a keen amateur yachtsman, and as such sailed with me throughout last summer. I am indebted to his "nippiness" on the runners that there was no bill for damaged spars at the end of the season.

The regatta over, the curtain was once more rung down, and marked the close of another season of the Gibraltar Yacht Club.

*Eheu fugaces . . . labuntur anni !*

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## Reviews.

IONIC MEDICATION: THE PRINCIPLES OF THE METHOD AND AN ACCOUNT OF THE CLINICAL RESULTS OBTAINED. By H. Lewis Jones, M.D., F.R.C.P.Lond. Second Edition. London: H. K. Lewis. 1914. Pp. viii and 152. Price 5s.

The first issue of this book was reviewed in the "Journal" of November, 1913, and as only six months have elapsed since the publication of the first edition, there has not been much time for the collection of new matter.

The author has, however, added short sections on pericarditis, tenosynovitis, and on the elimination of lead from the system. We can only cordially endorse the favourable opinion expressed in the original review and trust that the book will attain an even wider circulation than the rapid exhaustion of the first edition indicates. O. L. R.

A TEXT-BOOK OF MEDICINE. By Professor G. Dieulafoy. Translated by V. E. Collins, M.D.Lond., and J. A. Liebmann, Ph.D., M.A., LL.D. Second Edition of the Authorized Translation from the Sixteenth Edition of Dieulafoy's "Manuel de Pathologie Interne." Baillière, Tindall and Cox. 2 vols. Pp. 2156.

The fact that this is a translation of the sixteenth edition of Dieulafoy's "Manuel de Pathologie Interne" is in itself a guarantee of

the exceptional merit of this work, and indicates the high position it holds in France as a standard treatise on medicine. The various sections are most fascinatingly written, while clearness and lucidity of description, close reasoning, and constantly recurring evidences of keen observation stamp it as the work of a great clinician. Like the classical writings of Watson and Trousseau, much of the charm and interest to the reader depends on the many well-told cases which mark the pages in every section of the work. These are used to illustrate many points both in relation to diagnosis and treatment, and they are certainly most helpful in clinching an argument or in elucidating an obscure point. The various diseases are dealt with on a systematic basis, and prominence is given both to the pathology and to the clinical phenomena of the disease under discussion. The paragraphs on treatment are particularly good, and the instructions given are full, precise and, above all, practical.

Amongst the best sections in the treatise are those dealing with diseases of the respiratory system, diseases of the digestive system, diseases of the kidney, and diseases of the nervous system.

In discussing asthma, attention is drawn to asthma following nasal lesions. Ever since Voltolini of Breslau in 1871 published cases of asthma cured by the removal of nasal polypi, hypertrophy of the nasal mucosa, deviation of the septum, polypi, &c., have been accused of causing most cases of asthma, and the result was attempts to destroy the cause by cutting and burning the nasal fossæ. Dieulafoy considers this has been overdone. He recognizes that occasionally it may be necessary to deal with the nasal mucosa, which may be the origin of the reflex which provokes the asthmatic attack, but considers that the special excitability is most often present elsewhere (bronchi, lungs, or centres in the medulla).

In the description of pneumonia the technique is given for an agglutination test as a means of deciding in doubtful cases whether a pneumococcal infection is present or not.

Dieulafoy designed the aspirator in 1869, and applied the method of aspiration to the treatment of pleural effusions, and to his former teacher, Trousseau, is ascribed the credit of first having clearly stated the indications for, and the operative technique of thoracentesis, but by trocar puncture. As might therefore be expected, diseases of the pleura are dealt with in great detail, and very much more fully than in any of our English text-books, and the same is true of the method of performing thoracentesis. The value of serodiagnosis and cytodiagnosis, as applied to pleuritic effusions, is fully discussed. Sero-diagnosis is applicable in tubercular pleurisy. Courmont found that a positive reaction may be obtained by mixing a culture of tubercle bacilli either with blood serum or with pleuritic fluid in dilutions of 1 in 20, 1 in 10, or 1 in 5. Widal and Ravaut have described three kinds of pleurisy, each with its own cyto-diagnosis. The first comprise the transudates which occur in cardiac disease, Bright's disease, and cancer, in which endothelial cells from the serosa are almost exclusively met with. The second variety includes the acute infective pleurisies in which polynuclear leucocytes exist in abundance. The cellular formula in the third variety is characterized by the almost exclusive presence of lymphocytes with a certain number of red corpuscles, and the indication is that the pleurisy is

tubercular. Rapid and obstinate recurrence of fluid after thoracentesis is also an indication of tubercular pleurisy.

There is a very full account of appendicitis in the section dealing with diseases of the digestive system. In this the author directs special attention to the toxi-infective nature of the disease. Appendicitis is not only to be feared because of the peritoneal or remote infections, but also because it poisons its victims in addition to infecting them. Formerly, the danger of appendicitis was supposed to consist in perforation and peritonitis, which was looked upon as the only complication to be feared. The toxicity of appendicitis is now proved and it has been shown that the microbes in the closed cavity may kill by the toxins they produce. These toxins cause early lesions in the kidneys, liver, stomach, &c., which are in a large degree responsible for the often rapidly fatal complications of appendicitis. To this toxæmia of appendicular origin Dieulafoy has given the name of "appendicæmia." Attention is also called to the treacherous calm which occurs in some cases, and it is urged that the only rational treatment is early surgical intervention and removal of the toxi-infective centre. Under diseases of the liver, a special sub-section is devoted to toxic appendicular hepatitis, and under diseases of the kidneys, toxic appendicular nephritis is discussed. Dieulafoy ends the discussion of the latter condition by stating that he thinks the poisoning of the kidneys by appendicular toxins might in some degree account for the origin of Bright's disease.

The section on diseases of the kidneys is very thorough, and again we find the pages marked by originality of thought and evidence of wide experience. For instance, under the designation "Brightism" the author groups certain slight symptoms which point to commencing Bright's disease. In its most common form Bright's disease has an insidious onset. For a long time before marked symptoms make their appearance, minute questioning will often elicit the facts that there have been increased frequency of micturition, cramp in the calves of the legs, sensation of dead fingers, occasionally morning epistaxis, and sometimes headaches. On various occasions the patient may have had buzzing in the ears, defective hearing, increased sensitiveness to cold, and electric shocks which usually occur during sleep and wake the patient up. In many people with Bright's disease the temporal artery is hard, tortuous, and dilated. It is stated that the foregoing symptoms may mark the onset, or may be present at any stage of Bright's disease, and that they are of importance, mainly, because they often give a clue when albumen, œdema, &c., are wanting.

The section on diseases of the nervous system is also very complete, and it contains most interesting descriptions of the various diseases of the brain and spinal cord. The sub-section on the neuroses is very extensive, and gives fuller information than is usual in our English text-books.

Another special feature is that, in dealing with the diseases of the various systems, syphilitic affections of the different organs are separately discussed; for example, syphilitic pleurisy, hepatic syphilis, syphilitic nephritis, aortic syphilis, cerebral syphilis, &c., and these sub-sections are among the best in the work. In connexion with treatment by mercury, Dieulafoy recommends injections of the biniodide in preference to all other methods, and with the mercury he often gives iodide of



potassium in increasing doses. Details are given under the several headings, and in the appendix on therapeutics at the end of the second volume.

Finally, the translation has been admirably done, and it brings within reach of the English reader a very complete presentation of French practice, and one which is well worth careful study because of the thoroughness of the teaching.

T. McC.

PROTEIN AND NUTRITION: An Investigation. By Dr. M. Hindhede. London: Ewart, Seymour and Co., Ltd. Pp. x and 201. Price 7s. 6d. net.

This book was written in the year 1905, and was published in Denmark in 1906. Further experiments carried out by the author have necessitated the issue of the present edition.

In the preface, the author draws attention to the fact that his book, upon its appearance in Denmark, attracted great attention and excited as much interest among the general public as among members of the medical profession. While hoping that the same interest may be excited in this country, one cannot, however, hold out much hope that Dr. Hindhede's personal view of the advantage of a low protein diet will meet with universal acceptance. As he himself remarks, the greatest pleasure in life is to feel healthy in body and mind; but the diet he advocates, especially the low protein diet for children, will not conduce to this desirable end, at least among the English race.

The work is well worth perusal, and there are many sensible suggestions which will appeal to those interested in the subject.

W. W. O. B.

KURZES LEHRBUCH DER MILITAR HYGIENE. By Dr. med. et phil. Jaroslav Hladik, Oberstabsarzte. Vienna and Leipzig: Joseph Safar, 1914. Pp. xvi and 519. Price 12 marks.

This text-book gives an excellent exposition of hygiene in general, with some reference to military conditions. It hardly comes up to the level of thought that one expects of a military hygiene textbook in these days, since it does not insist sufficiently on the position occupied by the sanitary department as an essential integer in the organization of the Army. From the purely hygienic point of view it is an excellent textbook, referring to all the branches of the science, and can be confidently recommended to any officer with a sufficient knowledge of the language in which it is written. The chapter on barracks is rather short, but contains interesting illustrations, marred only by the eccentricities of the draftsman, whose legends seem designed more to darken counsel than explain the allocation of accommodation. This is a fault we occasionally come across nearer home. The natural ventilation of the barrack rooms seems bad to our ideas. Rooms are built back-to-back with only one outside wall. The means of escape in case of fire also appear insufficient. A short but clear account is given of physical work and education, but there is here, as elsewhere, comparatively little that is original. The book is of handy size, and there is not, as far as I know, any English handbook at once so full, so clear, and so well illustrated. The Austrian Army is to be congratulated on having so excellent a handbook to refer to. While very complete, it demands neither a separate book-shelf in quarters or

additional transport whilst on the move for its use, a combination of virtues conspicuously absent in some other textbooks on this subject.

C. M.

THE DEPOT FOR PRISONERS OF WAR AT NORMAN CROSS, HUNTINGDONSHIRE, 1796 to 1816. By T. J. Walker, M.D. London: Constable and Co., 1913. Pp. xiv. and 341. Price 10s. 6d. net.

This extremely interesting book deals with a subject with which but few civilians, and not many soldiers, are familiar. Except during the Crimean War, when the numbers were comparatively small, and their retention brief, prisoners of war have not been seen in the British Isles for a full hundred years. It seems to take us almost back to the middle ages to read of men being kept in prison for year after year for no other reason but that they were subjects of a foreign Power. For many of these unfortunates were not combatant soldiers and sailors, but merely passengers on enemies' ships. And yet remote though the subject seems, Dr. Walker tells us that the children of one of the prisoners at Norman Cross are still alive in that neighbourhood, and there must be many of us not much past middle age who have heard stories about such captives from our elders who actually saw them. A passage of great psychological and anthropological interest is that referring to the class of men denominated at Dartmoor "Romans": men who apparently lost all sense of civilization, and who having lost all their money by gambling, hypothecated their rations in advance in the same amusement, and parted with their last garment to provide means for its enjoyment, living in a state of savagery that would hardly be tolerated by even the most degraded tribe, even by that to which the classical midshipman's report applied. Even stranger than the depths to which these men sank is the fact that some of them at least retained sufficient moral resiliency to be able to return, not only to decency, but to such an amount of self respect and moral strength as to be recognized as fitted to hold positions of authority and trust. Thus one became a priest renowned for his charity and piety, another a high official under Louis Philippe, and a third amassed enormous wealth. The handiwork achieved by the prisoners also furnishes several interesting pages and illustrations. When one considers the materials at their disposal, the bones from their rations and the straw from their bedding, the workshop in which they laboured, and the rudeness of their tools, it is difficult to imagine the patience which could achieve such marvels as the model of the guillotine, or the working mechanical model of female figures on a pedestal. How hopeless, too, must have been the despair of the wretch who could plan such a course of work and look forward to a period of confinement long enough to bring it to completion. One is driven to suppose that such work was undertaken in self defence, as the only safeguard against falling to the depths of degradation already spoken of. The health of the prisoners seems on the whole to have been good; decidedly so considering the period. Tubercular disease, as might have been expected, found a favourable nidus, but does not seem to have been worse than, or even as bad as, it was in the army at the same date. It was, however, the chief cause of mortality. Occasional bad epidemics occurred, the most severe in 1800 to 1801, probably enteric fever. In this 1,200 men died during the six months of severest incidence. As might be anticipated

the "Romans" (or more correctly, speaking of Norman's Cross, "Les Misérables") suffered most on these occasions. Dr. Walker is to be congratulated on having written a most interesting book, and *inter alia* dispersed the unfounded aspersions made by Napoleon I on our national character in respect of the treatment accorded by us to our prisoners and captives.

C. M.

THE SANITARY INSPECTOR'S HANDBOOK. By Albert Taylor. Fifth Edition. London: H. K. Lewis, 136, Gower Street, W.C. 1914.

The author may be congratulated on the appearance of the fifth edition of his well known and widely appreciated handbook. The work has been thoroughly revised to bring it up to date. Such laws as have lately been made dealing with matters affecting food and sanitary measures are included, and some new illustrations added. It is a handbook which every sanitary officer in the Service would do well to read carefully and to have by him for reference, for there is probably no better work of the kind in the English language.

W. W. O. B.

THE DIETETIC TREATMENT OF DIABETES. By B. D. Basu, Major, I.M.S. (Retired). Fourth Edition. (Revised and enlarged). The Pavani Office, Bhuvoneshroni Asbram Bahadurgonj, Allahabad. 1913. Price Rs. 1, 8.

Major Basu's book on the "Dietetic Treatment of Diabetes" has been out of print for some time, and in issuing this edition the opportunity has been taken of revising the text and adding new matter.

In the preface the author states his views on the causation of diabetes, which he considers is due to an alimentary toxæmia, brought on in various ways.

In the book itself he recommends a vegetarian dietary as being most suitable to diabetes, at any rate in India.

The author would entirely exclude meat from the dietary, while allowing milk, butter, and vegetable oils. He quotes very largely from various writers, and gives a good summary of the views held regarding the dietary in diabetes at the present day. The book shows evidence of a wide range of reading, and is well worth perusal, although the author's opinions may not find universal acceptance.

O. L. R.

LESSONS IN ELEMENTARY TROPICAL HYGIENE, FOR THE USE OF PUPILS IN TROPICAL SCHOOLS. By Henry Strachan, C.M.G., L.R.C.P.Lond., M.R.C.S., F.L.S., F.Z.S., F.R.A.T. London: Constable and Co. 1913. Price, 1s. net.

This little book has been written at the request of many interested in education both in Africa and the West Indies, and is founded on lectures delivered by the author many years ago in West Africa.

The book is divided into twelve lessons written in simple language and in a form suited for delivery by the teacher.

The first two lessons deal with diseases in general, their courses, and the necessity of a knowledge of sanitation; the following five lessons give a brief account of such diseases as tetanus, malaria, cholera, leprosy, smallpox, and some parasitic diseases.

Lessons VIII and IX are devoted to air and water respectively, and

in the latter there is a section dealing with the construction of wells and the storage of water, which should prove very useful. The last three lessons contain instruction on food and cooking, dwellings and the disposal of refuse, and a few remarks on clothing. The book contains a number of diagrams intended as a guide to the teacher in making drawings on the blackboard; they unfortunately do not show the relative sizes of the objects illustrated. This book, like many others of the same kind, should prove very useful for the purpose for which it is intended, and any child who has been carefully taken through the various lessons in it will have acquired a considerable amount of knowledge, which, if properly applied, should be beneficial alike to health and comfort while living in tropical surroundings.

O. L. R.

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### Current Literature.

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**Wassermann Test.**—*Technique.* Probably nothing is more important to the success of the Wassermann test than the extract, and the varying qualities of this reagent have no doubt accounted largely for the different results obtained by various workers in similar conditions. Following on the observation by Browning, Cruickshank, and Mackenzie that the addition of cholesterol to a solution of lecithin increased its deviating power with syphilitic serum, Sachs advocated the addition of cholesterol to crude alcoholic extracts, and this had been found to be a great improvement. Michaelis had found that alcoholic extract of human heart muscle is constant in quality, and these observations led the way to a valuable investigation by McIntosh and Fildes (*Zeitschrift f. Chemotherapie*, Originale, 1912, Bd. i, H. 1) in which they showed that extract of human heart muscle, five parts, with the addition of alcoholic solution of cholesterol (1 per cent), four parts, is unvarying in quality (as tested with twenty-four extracts on the same sera) and superior to alcoholic extract of syphilitic liver (prepared by Gans for the market under the directions of Wassermann and Meier), to alcoholic extract of human heart without cholesterol, and to the lecithin-cholesterol mixture of Browning, Cruickshank, and Mackenzie. The heart extract was prepared by grinding the fat-free muscular part of a human left ventricle with absolute alcohol in clean sand, the proportions being one of heart to nine of alcohol, for one and a half minutes and shaking for one and a half hours in a shaker. The quantity used was one-third that which when acting alone just inhibited  $2\frac{1}{2}$  minimum hæmolytic doses of complement. More recently Fildes and McIntosh (*Brain*, 1913, vol. xxxvi, part ii) have modified the composition of their extract and now use two parts of cholesterol solution to three of heart extract, mixed just before use and diluted to 1 in 15 with saline by putting the necessary amount of extract into a large tube and adding the saline suddenly. The quantity used in the test is 0.5 c.c., which is one quarter the amount which by itself can just destroy  $2\frac{1}{2}$  minimum hæmolytic doses of complement for 0.5 c.c. sen-

sitized cells. The earlier work of these authors has been repeated in principle and confirmed by Walker and H. Swift (*Journ. Exp. Med.*, 1913, p. 75), who found that a human heart extract containing 0.4 per cent of added cholesterin was superior to ox heart, guinea-pig liver, and normal foetal liver extracts, each containing the same amount of cholesterin, as well as to alcoholic extract of syphilitic infant's liver containing 0.25 per cent of cholesterin, to Lesser's ethereal extract of dried human heart, and the extract of Wassermann and Meier already referred to. Kolmer, Laubach, Casselman, and Williams (*Archiv Int. Med.*, 1913, December 15, p. 660), in confirming these results, have classified extracts in the following order of merit: Human, pig, and ox heart, human, pig, and ox liver, each with the addition of 0.4 per cent cholesterin, alcoholic extract of syphilitic infant's liver, Noguchi's acetone insoluble fraction, alcoholic extract of human heart, Kolle and Stiner's acetone soluble extract, and alcoholic extract of normal liver. The present writer has found an extract prepared according to the latest directions of Fildes and McIntosh to be a marked improvement on all the preparations he has previously used.

R. Donald (*Proc. Roy. Soc., B.*, 1913, vol. lxxxvi) has invented an automatic dropping pipette which promises to save a great deal of the fatigue and eye-strain involved in the Wassermann and other complement deviation tests. The principle of the pipette is that the size of a drop is determined by the external diameter of the delivery nozzle and is constant for all drops of the same fluid when the rate of delivery does not exceed one per second. To obtain a drop of required size a piece of tubing, capillary or otherwise, according to the size required, is pushed through a given hole in a Starrett Morse drill and wire gauge till it is held, and is then cut off flush with the upper surface of the gauge plate. The nozzle must not be touched with anything greasy. If required for the addition of such reagents as complement, extract, and sensitized cells to each of a large number of test-tubes, the nozzle, throttled at its upper end, is attached by a short rubber tube to a separator funnel which is filled with the necessary reagent. The tap of the funnel is turned sufficiently to allow drops to fall at the rate of less than one per second, and the block of tubes run along underneath. Fildes and McIntosh (*Brain*, 1913, vol. xxxvi, part ii) apply this principle to the measurement of sera for the Wassermann test. They find that a capillary tube gauged in No. 53 hole of a Stubbs's Starrett Morse drill and wire gauge-plate delivers drops of 0.025 c.c. each under hand test pressure, and as the maximum quantity of serum which they use in the test is 0.1 c.c., four drops of neat serum are put into each of the tubes requiring it. The present writer can testify to the great saving of labour which the above device accomplishes. For the measurement of extract, complement, sensitized cells, and saline, a simple plan is to fit a short length of ordinary quill tubing, throttled at its upper end to each of four separator funnels, by means of a short piece of rubber tubing. The actual size of drop of each of the reagents can then be found by counting the number of drops in the delivery of, say, 10 c.c., and the necessary strengths are then calculated. Then for a formula where the relation of serum to sensitized cells is 1 to 5 it is easy to find by trial in which hole of a Stubbs's plate to gauge the capillary pipettes for measurement of the serum.

L. W. H.

**Gonococcal Infections: Diagnosis and Treatment by means of Vaccines.**—Bruck and Sommer (*Münch. med. Wochenschr.*, 1913, No. 22), and Sommer (*Archiv f. Derm. u. Syph.*, Originale, November, 1912, see this Journal, March 14, p. 348) hold that while local reaction at the site of injection is of no particular value in diagnosis, a focal reaction often occurs in gonorrhœal cases and is useful. They advocate, as being more likely to produce diagnostic reactions, intravenous injections of arthigon, the dose recommended being 0.1 c.c. for men, and half this amount for women. They consider that a rise of 1.5° C. is suggestive, and Sommer thinks that a rise of 2.5° C. is almost certainly diagnostic, especially if the patient has a second rise of temperature the next day. Brahns (*Berlin klin. Wochenschr.*, 1913, No. 2) found that after an intravenous injection of arthigon the majority of gonorrhœal cases had a rise of temperature of over 1.5° C. as stated by Bruck and Sommer, but that out of fifteen certainly non-gonorrhœal cases eleven had a rise of 1.5° C. or over, and two of these had the double rise. He concludes, therefore, that the temperature reaction is of no diagnostic value. In three cases which had been free from urethral discharge for fourteen to twenty-four days the injection was followed by a return of the discharge. He has also used arthigon as antigen in complement deviation, the quantities being, arthigon, 0.6 c.c., serum, 0.4 c.c., and complement 0.1 c.c. against 1 c.c. of sensitized cells, but had only sixteen positive results out of 137 cases of complicated gonorrhœa. If the strength of arthigon is twenty millions per cubic centimetre as stated, the small proportion of positive reactions is not surprising, especially considering the amount of complement used. Habermann (*Münch. med. Wochenschr.*, February 24, 1914, and March 3, 1914) reviews the literature on the subject of gonococcal vaccines, more especially gonargin and arthigon, and relates his own experience with intravenous injections of arthigon. As to rises of temperature after injection, five out of thirty-two certainly gonorrhœal cases had no rise, while in nine out of eighteen non-gonorrhœal cases the temperature rose to over 38° C. He concludes on this point that rise of temperature after intravenous injections of arthigon is of no diagnostic value. With regard to the focal reaction, he agrees that it certainly occurs, but is of no great value on account of its inconstancy. Leslenyi and Winternitz (*Wien. klin. Wochenschr.*, No. 8, 1914) found in gynecological practice that a rise of temperature of over 1.5° C. is of no value after an intravenous injection of 0.05 c.c., since it occurred in only ten out of twenty-five certainly gonorrhœal cases, and in many normals (number not stated). After a dose of 0.1 c.c., out of thirty-two cases eleven had a rise of temperature to over 38.5° C., in nine the temperature rose 1° C., and in the remainder it remained normal. They conclude that to elicit a reaction it is necessary to give 0.1 c.c., and when a rise of temperature to the necessary height occurs it is only diagnostic when accompanied by a focal reaction. As this occurred in only a third of their cases they are not impressed with the method.

Regarding the therapeutic value of intravenous injections of arthigon the opinions of these workers seem to be divided, more particularly with regard to the relative merits of intravenous and intramuscular injections. Bruck and Sommer held that intravenous injections are better, the superior results being shown in cases of prostatitis. They commenced with 0.1 c.c. and increased every three or four days by about 0.1 c.c.



according to the reaction which followed the last injection. Not more than six injections were given as a rule. Habermann does not believe that intravenous injections have any advantage therapeutically over intramuscular, nor does he agree with Bruck and Sommer that better results follow the severer reactions or those in which the double rise occurred. Leslenyi and Winternitz found it useful in gonococcal infections of the tubes and parametrium, but not in similar affections of the uterus and parts below. All workers speak of the occurrence of other complications during the period of the vaccine injections, especially Habermann, who quotes the experience of numerous others to the same effect.

L. W. H.

**Plague Investigations in India.** (Eighth Report of Advisory Committee, *Journal of Hygiene, Plague Supplement III.*)—This report consists of a series of articles which may be briefly summarized as follows:—

S. Rowland points out that the immunizing power of broth-grown *Bacillus pestis* is of a low order against serum-grown organisms, but by using an extract prepared from bacilli grown on a medium containing horse serum heated to 55° C. he has obtained a degree of immunity closely approaching that produced by inoculation of living attenuated cultures. In an experiment with a whole vaccine prepared from the serum-grown organisms he failed to immunize against a similar serum growth, but was unable to decide whether this was due to changes in the antigen produced by the heat applied (60° C.) or to the dose being too small. Cultivation in heated serum media greatly enhances the virulence of a strain, whereas cultivation in fresh serum diminishes it, even in many cases after preliminary growth in heated serum.

R. St. J. Brooks describes experiments on phagocytosis of *B. pestis* grown on various media. The phagocytic index, determined according to Leishman's procedure, was approximately the same for strains grown in broth, and in heated horse, rat, and human serum. Laboratory races of plague bacilli grown in fresh rat or horse serum show a high resistance to phagocytosis, and are not ingested by human leucocytes to any appreciable extent. Strains of plague bacilli taken direct from an animal dying of the disease show a similar reduction in capacity for phagocytosis, which persists for several days on subculture on broth agar.

Rowland describes morphological changes in *B. pestis*, and shows that, especially in serum-broth cultures and in spleen smears from plague rats, it often has a viscid envelope or capsule with an ill-defined margin, most easily demonstrated by the Indian ink method. Envelopes formed in serum-broth disappear on transferring the washed organisms to fresh rat serum or immune horse serum.

A. W. Bacot and C. J. Martin summarize the results of their experiments on transmission by fleas as follows: "Under conditions precluding the possibility of infection by dejecta, it was found that two species of rat-fleas, *Xenopsylla cheopis* and *Cerastophyllus fasciatus* fed upon septicæmic blood, can transmit plague during the act of sucking, and that certain individuals suffering from a temporary obstruction at the entrance to the stomach were responsible for most of the infections obtained, and probably for all.

"In a proportion of infected fleas the development of the bacilli was found to take place to such an extent as to occlude the alimentary canal

at the entrance to the stomach. The culture of plague appears to start in the intercellular recesses of the proventriculus, and grows so abundantly as to choke this organ and extend into the oesophagus. Fleas in this condition are not prevented from sucking, as the pump is in the pharynx, but they only succeed in distending an already contaminated oesophagus, and on the cessation of the pumping out some of the blood is forced back into the wound. Such fleas are persistent in their endeavours to feed, and this renders them particularly dangerous. Fleas suffering from obstruction do not necessarily perish, and in the course of some days the culture obliterating the lumen of the proventriculus may autolyse and the passage again become pervious. They are, however, incapable for the time being of imbibing fresh fluid, and are, therefore, in danger of drying up if the temperature is high and the degree of saturation of the atmosphere low. Although, as far as our observations go, they withstand desiccation quite as well as normal fleas which are not fed, their length of life must be short directly hot, dry weather sets in, and we are led to wonder whether this fact may not, to some extent, explain why in India epidemic plague is confined to the cooler and moister seasons, and particularly why in Northern and Central India the epidemics are abruptly terminated on the onset of the hot, dry weather."

Rowland, in a series of experiments on subculture of a laboratory stock strain in different media, finds that a degree of virulence comparable with that of organisms derived from a plague rat's spleen can be obtained in a medium composed of extract of rat spleen with rat serum or in ox spleen juice. This result is not always achieved, and he is unable to explain the irregularity. The fresh serum of the normal rat has the power of depressing the virulence of the plague bacillus, markedly in the case of broth-grown organisms, but less in the case of bacilli direct from the body of an infected animal. He suggests, therefore, that "infection of a rat by plague follows or not according as the infecting organisms when pitted against this property of the rat's serum succeed or fail in breeding out a strain of organisms which can resist this depressing action."

A. Bacot has investigated at Loughton, Essex, the effects of varying condition of temperature and humidity on the species of fleas associated with rats and man, namely *Ceratophyllus fasciatus*, *Pulex irritans*, *Ctenocephalus canis*, *Leptopsylla musculi*, and *Xenopsylla cheopis*. In comparison with the later stages in the life-history, eggs are relatively insusceptible to external conditions. The range of variability in the time between laying and hatching (two to ten days) is small, and the response to temperature changes direct and simple. The upper limit of temperature fatal to eggs has not been determined. *C. fasciatus* showed a high percentage hatching at 85° F., 9 per cent of *P. irritans* hatched at 93° F., and on one occasion 27 per cent of *X. cheopis* hatched at 93° F. Cold reduces the number of hatchings. At 40·9° F. 50 per cent of eggs of *C. fasciatus* hatched; a small proportion of *P. irritans* hatched at 46° F., while 55° F. appears to be the minimum for *X. cheopis*. A temperature of 65° to 80° F. with a humidity of ·70 or over is the most favourable, and if the temperature be above 60° F. humidities below ·50 to ·55 are harmful. In the case of *C. fasciatus* and *P. irritans* warmth (75° F.) combined with low humidity favours the fertility of eggs laid.

Newly hatched larvæ were able to live without food, other conditions being favourable, from several days to over a month. A high percentage

of moisture in the air is important, but a situation with a still atmosphere may be more favourable than a draughty one with a higher average humidity. As regards the food of larvæ, flea-fæces may be a necessity for *C. fasciatus*, and are favourable for *X. cheopis* and *P. irritans*. The latter can also exist on rat fæces and on bran. With these three species the larval stage is not necessarily one of steady development, and sometimes a period of delay occurs before the spinning of the cocoon is commenced. Thus the time occupied by the active larval period (up to the formation of the cocoon) ranges from 5 to 114 days for *C. fasciatus*, 9 to 202 days for *P. irritans*, 12 to 84 days for *X. cheopis*, and 11 to 142 for *Ct. canis*, and in this temperature is not the sole factor.

The duration of the cocoon period varied from 8 days to well over a year for *C. fasciatus*, from 7 to 239 days for *P. irritans*, from 7 to 182 days for *X. cheopis*, and from 7 to 354 days for *Ct. canis*. The writer is of opinion that a considerable portion of this time is passed in the resting larval condition, certainly so in the case of *C. fasciatus*, and that development in the pupa, though delayed by cold and hastened by heat, is continuous until the pupal envelope is shed. There is some evidence that a fall of temperature during larval life predisposes both *X. cheopis* and *P. irritans* to lengthen their cocoon period. *Ct. canis* showed a strong disposition to spend the winter in the cocoon stages. In the case of *P. irritans* there is the same tendency, but it is less obvious, individuals continuing to emerge throughout the winter if the weather is mild. *C. fasciatus* also frequently passes the cold weather in the cocoon, and a certain proportion of individuals of this species are in the habit of æstivating during the hot months and emerging during the cooler months. The optimum temperatures for the development of larvæ and pupæ are 5° F. higher for *P. irritans*, and 15° to 20° F. higher for *X. cheopis* than for *C. fasciatus*.

At 45° to 50° F., with nearly saturated air, adult fleas can live for many days unfed (e.g., *P. irritans* 125 days), but under moderately unfavourable conditions of temperature and humidity their powers of endurance are but small in the absence of food. Although kept in a box, if fed on their natural host, *P. irritans* may live for upwards of 513 days, *C. fasciatus* for 106 days, and *X. cheopis* fed on man for 100 days. Under natural conditions both rat fleas would probably live longer. Most of these species copulate shortly after emergence, but no sign of eggs or brood has been seen in receptacles in which unfed fleas have been kept. The number of eggs laid, but not their fertility, depends on the amount of food taken. Of fleas fed on man *C. gallinæ* alone laid eggs after 15 minutes' daily feeding; with more than 15 minutes daily *P. irritans*, *C. fasciatus*, and *X. cheopis* laid fertile eggs, while *Ct. canis* required 5 to 12 hours daily.

The total possible duration of life from the egg until death as a perfect insect is estimated at for *C. fasciatus* 680 days, *X. cheopis* 376, *P. irritans* 966, *Ct. canis* 738, and *C. gallinæ* 480. Allowing for the longest recorded unfed imaginal lives, active adults may be found in favourable situations where there have been no hosts for considerable periods, estimated at for *C. fasciatus* 22 months, *P. irritans* 19 months, *X. cheopis* 10 months, *Ct. canis* 18 months, and *C. gallinæ* 12 months.

Bacot endeavoured to infect active larvæ of *C. fasciatus*, *X. cheopis*, and *P. irritans* by feeding them on infected material. *Staph. aureus* was

recovered in several instances from the alimentary canal during the active larval stage, but there is no evidence that such infection can survive the pupal stage.

The same writer carried out experiments to ascertain the relative efficiency of the vapours of various insecticides and disinfecting fluids in receptacles shut off from the external air by only a thin piece of cotton. In experiments with *C. fasciatus* conducted at a temperature of 50° to 60° F., he found naphthaline and 6 per cent. solution of phenol were the best of those tried. In experiments with *X. cheopis*, at temperatures averaging 60° to 65°, naphthaline and 6 per cent phenol were again the most powerful, and camphor was also effective. The cocoon stage appeared to be insusceptible to the vapours of 10 per cent lysol, commercial "benzine" (volatile petroleum oil), and paraffin oil. He recommends that in practice naphthaline should be applied either in emulsion or in solution. C. J. C.

**Growth of Malarial Parasites in vitro.** J. G. Thomson and D. Thomson (*Annals of Tropical Medicine*, December, 1913, p. 509) withdraw aseptically 10 c.c. of blood from a vein into a test tube which contains  $\frac{1}{10}$  c.c. of a 50 per cent solution of glucose. After defibrinating the blood by stirring with a wire, it is poured into small tubes, about 1 in. column in each, and these are capped and incubated at 37° to 41° C.; 38° C., however, is the optimum temperature. It is unnecessary to destroy the complement or to remove the leucocytes as some writers maintain. Growth, moreover, takes place throughout the whole thickness of the corpuscles and not only on the superficial layer. The conditions of successful subcultures are glucose, fresh serum, and fresh red corpuscles; nevertheless four complete generations have been grown in one tube in nine days without renewal of the medium. If quinine has been given only a few parasites survive.

The malignant tertian parasite, *P. falciparum*, has been cultivated on twelve occasions, the benign tertian, *P. vivax*, on three. Asexual generations only have been grown, though Joukoff claims that he has observed the mosquito-cycle forms *in vitro*.

The time required to complete development varies from twenty-five to fifty hours. The malignant tertian parasites tend to clump, but the benign tertian do not. Malarial coma which sometimes occurs in the pernicious infection is probably explained by this agglutination of the plasmodia in the cerebral capillaries. The *P. falciparum* produces as many as thirty-two spores; the *P. vivax* usually sixteen only, never thirty-two. The pigment of *P. falciparum* soon collects into a compact circular mass, that of *P. vivax* remains scattered until immediately before segmentation. The morphology of both parasites in human host and culture-tube respectively is identical. C. B.

**Vaccine Treatment of Enteric Fever.** Watters (*Medical Record*, September, 1913, p. 518) has treated 158 cases of enteric fever with subcutaneous injections of 100 to 500 millions of killed typhoid bacilli obtained from a twelve-hour broth culture of an old laboratory growth, repeated every two to four days. There were seventeen deaths, but in nine of these fatal cases the patients were *in extremis* when the treatment

was begun, and death in another was caused by pneumococcic meningitis. Excluding these the mortality becomes 4·7 per cent. The death-rate of 100 control cases was 13. The duration of the pyrexia in the vaccinated was ten days less than in the controls. He has collected statistics of 1,120 attacks of enteric fever treated with killed cultures of the *Bacillus typhosus*; 67 deaths are recorded. Watters, however, thinks that the injections were commenced too late in several of the fatal cases, and that the true mortality was about 5 per cent. Relapses were less frequent in the inoculated. He quotes Benny and Dorset, who administered doses of 700 to 1,000 millions of *B. typhosus* to 19 patients without a death occurring among them. The average duration of the fever was twelve days, that of the controls twenty-five to forty-five days. The mortality of 126 of Gray's patients was 7 per cent; that of the unvaccinated cases, 72 in number, was 9·7 per cent. There were relapses in only 6 per cent of the vaccinated cases, in contrast with 15 to 25 per cent occurring in typhoid patients treated otherwise. Attention is drawn to what was insisted on when the vaccine treatment of enteric fever was discussed in these pages (JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, September, 1906, p. 279), namely, that the vaccine therapy must be commenced as early as possible, and an immediate diagnosis for this purpose must be secured by means of cultures of the blood withdrawn as soon as the patient comes under observation. Moreover, the first dose should be small, especially in severe cases. The evidence which has been collected during the past eight years on the subject of the vaccine therapy of enteric fever, makes it clear that if we neglect this method we fail in our duty when we are called upon to treat a case of enteric fever.

C. B.

**Antityphoid Inoculation in France.** (Annexe No. 448, "Documents Parlementaires," *Sénat*, 1913).—In bringing forward in the French Senate a bill for compulsory inoculation against enteric fever in the French Army, December 11, 1913, M. Léon Labbé gave the following figures:—Since the commencement of the operations in Morocco in September, 1907, there have been 5,380 cases of enteric fever with 753 deaths. During the last twenty years 66,000 cases occurred in the home army alone with 10,000 deaths. There has been a decrease since 1888, in part due to an endeavour to supply all barracks with good drinking water and in part to improved sanitation.

After enlarging on the wonderful results obtained in other armies by antityphoid inoculation, he referred to their own results in North Africa. Starting from August, 1911, and excluding mild and doubtful cases, the disease incidence was 87 per 1,000 with a death-rate of 8·35 per 1,000 among the non-inoculated, while no cases occurred in the inoculated. On June 1, 1913, there were 52,938 inoculated men in the home army, none of whom had had enteric fever.

On the same date, of 23,947 inoculated men in Algiers-Tunis, only one man had had enteric.

	EASTERN MOROCCO		WESTERN MOROCCO	
	Inoculated	Non-inoculated	Inoculated	Non-inoculated
Disease incidence per 1,000 ..	0	38·23	2·96	168·75
Death rate per 1,000 ..	0	5·51	·09	21·29

Based on these figures it has been calculated that in 1912 inoculation has saved 2,101 admissions and 266 deaths. Every year 200 deaths from typhoid are registered in the home army in soldiers 21 to 22 years old. Algiers-Tunis pays an annual tribute of 100 deaths to this disease.

After referring to various recent epidemics in France in which inoculated men all escaped infection, M. Léon Labbé put forward the motion that antityphoid inoculation should become compulsory in the army.  
J. V. F.

**Compulsory Antityphoid Inoculation in France.** *Le Caducée*, for January 10, 1914, in commenting on this new law, while recognizing the importance of compulsory inoculation in North Africa, does not approve of universal inoculation. It quotes a recent lecture by Professor Vincent on a typhoid epidemic in September and October, 1913, at Montauban, affecting both the military and civil population. In October, during the epidemic, 3,000 recruits joined this station, and they were all inoculated, and the older soldiers were also encouraged to be inoculated, with the result that the epidemic died out in barracks while it continued in the town. None of the inoculated cases got the disease. *Le Caducée* argues on the strength of this that if the authorities have the power to order inoculation of the troops when they find that they are in an infected area, then it is not necessary to inoculate all the troops in garrisons free from this disease.

The Syndicat médical de Paris has issued a manifesto that enteric fever always prevails in the same Army Corps areas (namely, the Midi), and is due to well-known sanitary defects in the garrison towns there. They are of opinion that the urgent necessity is to put these towns in a good sanitary condition, rather than to inoculate the troops, and that if the local authorities will not do this, then to withdraw the troops. The Syndicat is of opinion that compulsory inoculation of the troops will allow the municipalities to postpone *sine die* the sanitary improvements which are known to be indispensable. Individual immunization will replace general prophylaxis which alone stamps out epidemics. This would be a serious retrograde step.

The reply to the various arguments brought forward by *Le Caducée* would appear to be that the improved sanitation can be insisted on by the Government which has ordered the inoculation, and that until these defects have been remedied it is only fair to protect the army against municipal negligence.  
J. V. F.

**Expenditure on Equipment of the German Army Medical Service in Recent Years.**—In an article on improvements effected in the German Army Medical Service and in its equipment during the last twenty years (*Fortentwicklung des deutschen Kriegssanitätsdienstes und der Sanitätsausrüstung in den letzten 20 Jahren*), which appears in a special volume published to commemorate the sixtieth birthday of the Director-General of the German Army Medical Service (Professor Dr. Otto v. Schjerning), Oberstabsarzt Dr. Georg Schmidt concludes his article by quoting some of the amounts voted in recent army annual estimates:—



- (1) For provision of new field equipment, annually, from £5 to £10,000; in 1913, in addition to the above, £26,960 was specially voted for alterations and additions to equipment in fortress medical depots, to make dressing rooms in fortresses and to provide disinfecting apparatus.
- (2) For medical equipment for the cavalry, 1906-09 .. .. . £10,048
- (3) For alterations in medical equipment for troops and field medical units, 1901-13 .. .. . 148,417
- (4) For increase of material in the medical depots, L. of C., 1900-13 .. 34,908
- (5) To provide a second field dressing for the whole Army, 1907-13 .. 20,013
- (6) To increase the number of stretchers in the medical units, 1908-13 .. 5,990
- (7) To equip medical units with lighting apparatus, 1908-13 .. .. 6,000
- (8) To provide a new pattern of dressing tent to the medical companies (Sanitätskompagnie), 1913 .. .. . 2,500
- (9) To provide apparatus for more lying-down accommodation in improvised ambulance trains, 1908-12 .. .. . 8,535
- (10) To provide X-ray wagons and boxes to carry necessary materials for X-ray work for the medical depots, L. of C., 1911-13 .. .. . 16,700
- (11) To provide movable water sterilizing apparatus for medical depots, L. of C., 1912-13 .. .. . 7,333
- (12) To provide and store movable hospital huts, 1913 .. .. . 500,000
- (13) To provide and store ambulance wagons for garrison hospitals, 1907-13 .. 19,023
- (14) For additions to medical equipment of garrison hospitals, 1905-13 .. 15,200
- (15) To equip garrison hospitals with dental outfits, 1909-13 .. .. . 3,100

J. V. F.

**A Historical Treatise on the Care of Drinking Water in Armies in the Past** (*Die Trinkwasserfürsorge in den Heeren der Vergangenheit, D.M.Z.*).—Oberstabsarzt Dr. Haberling in the D.M.Z. for January, 1914, has published a most exhaustive essay on the history of the supply of good drinking water to armies in the past.

The first part deals with the Greek and Roman periods. He quotes authorities such as Xenophon, Plutarch, Julius Cæsar, Vitruvius, Hippocrates, Galen, Strabo, and many others. The importance of a good drinking water and the evil effects of polluted water, were thoroughly realized even in those days. It is interesting to read that the Romans in the Imperial days when on the march either boiled their drinking water or allowed the water to stand over-night in big jars and decanted it next morning less the precipitate. When the army became stationary they were at great pains to lay on a good water supply.

Coming to the Middle Ages, the celebrated Dr. Arnald de Villanova (1238 to 1311) wrote a book on camp hygiene in which the care of drinking water is dealt with. He laid down rules for examining wells, &c., and recommended that when an army was on the march, men on foot should be about two miles in advance to investigate the various water supplies. He and other writers had various suggestions for improving a bad water supply, which included boiling, filtration, addition of vinegar, certain plants and other substances, &c.

The writer then mentions other works, for example, by Schneeberger (1564), Minderer (1620), Luca Antonio Porzio (1685), and others up to the beginning of the last century.

There was really nothing very new to add to the knowledge of the Ancients until it was discovered that the essence of water purification lay in the destruction or absence of disease-carrying bacteria.

Dr. Haberling concludes his article by saying: "A means for purifying drinking water exists, which is to-day as much appreciated as it was

2,000 years ago, namely, boiling. While hygienists of the 18th century who were concerned with the health of armies held the process of boiling water in camp and on the march to be impractical, it is to-day possible by means of travelling water-sterilizers to supply troops with pure water as often as these wagons are available. Even in our day the final solution of the problem has not been reached. Every year in all armies, especially during manœuvres, a number of soldiers become ineffective from drinking bad water, for it is impossible to control all the sources from which the soldier will take water to quench his thirst and in the same way, on the other hand, there does not exist a practical medium which on addition to the water will immediately render it sterile or harmless and so save the soldier from infection."

J. V. F.

**To what Degree was Personal Contact responsible for the Dissemination of Cholera in Serbia in 1913?** (Welche Bedeutung kommt dem Kontakt bei der Verbreitung der Cholera in Serbien 1913 zu.?).—An article under the above heading by Stabsarzt Dr. Aumann appears in the *Berliner klinische Wochenschrift* for January 12, 1914.

The writer had personal experience in Serbia and based on this he maintains that cholera infection spread over a large geographical area, amounting to an epidemic, may be caused by personal contact alone.

In a cholera epidemic caused by water infection the average number of cases is from 1 to 2 per cent of the inhabitants, a typhoid epidemic caused by water can amount to 10 to 12 per cent.

He reports on two epidemics. The first was in the area Kocana—Stip—Kumanovo in the valley of the Bregalnitz. This occurred among the Servian troops and was undoubtedly due to water infection, the river being the only water supply available. The outbreak was sudden and the cases were numerous. Before any sanitary measures could be taken, the stream running through Kumanovo was infected by the military cholera-stricken cases which had collected there and who had been left to themselves. A few days later a similar sudden outbreak occurred among the inhabitants of the town. The inhabitants were in the habit of bathing and washing their clothes in the stream so that the numbers exposed to infection must have been great. Within a few days fifty civilians were infected (0.5 per cent of the inhabitants), and soon after another twenty-five to thirty persons. It is probable that double this number of cases occurred as there was no compulsory notification. An interval of some days followed. Later about 100 new cases developed (1 per cent of population). On this occasion the water supply did not come into consideration.

The epidemic was stamped out amongst the troops and they left Kumanovo, but as no energetic measures were taken to cope with the epidemic in the civil population cases kept on cropping up. These cases were undoubtedly contact infections for the water supply and the stream were found to be free of germs. Numerous infections occurred in the families and in the immediate vicinity of the original cases. The number of infections during this period was just double what it was during the water-conveyed epidemic.

The other epidemic mentioned by the writer was in the area between Pirot and Zajecar and the Bulgarian frontier. At the beginning of the

second Servo-Bulgarian war, the Bulgarians had occupied an area on the frontier, Jolbutin—Sukova—Djiniglavxe. Sanitary arrangements had been nil, so that when the villages were subsequently occupied by the Servians and the inhabitants they were all exposed to infection. In the town of Pirot and in practically all the surrounding villages cholera occurred, and in none of these could infection be traced to the water and it must be put down to indirect contact. With the disbanding of the Servian troops the disease was further disseminated. When the writer arrived in Pirot (September 14) the epidemic was reported to be over, as for several days no new cases had been reported, at any rate there was no doubt that the epidemic was rapidly dying out. He and his colleagues started a house-to-house visitation. By these means twenty-two fresh cases were transferred to hospital within the next ten days; there were ten other cases that died before they could be transferred. The experience was similar in a number of the surrounding villages.

Altogether they transferred seventy-five cases of true cholera to the hospital, and about an equal number died before transfer. He estimates that 1 to 2 per cent of the inhabitants in the area were affected. They found numerous infections in the families and the immediate neighbourhood of the original cases. There were several cases of discharged soldiers who had infected their families; in fact some of these men still had the disease when they returned home. The water supply was above suspicion and careful examinations were always made.

An exactly similar state of affairs occurred in a number of other districts; the discharged soldiers carrying the disease to their families and then further infections would occur. Thus it will be seen that by personal contact cholera can be spread over a whole country side. The writer also insists on the fact that the number of cholera cases seeking admission to hospital is only a small portion of the number of cases which actually occur. There are many ambulant cases which will escape detection if not looked for.

He disputes a statement made by Eckert in the *Deut. militärärzt. Zeit.*, 1913: "That contact infection in the epidemiology of cholera germs plays no important part," and says that by studying only one focus in which the disease occurs, one is bound to get a distorted idea of the situation, and that to get a true insight into the causation of an epidemic, the details of each case must be hunted out in the place in which it occurs.

J. V. F.

## Correspondence.

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### PROSPECTS OF EX-SOLDIERS OF THE CORPS IN BRITISH EAST AFRICA.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I enclose a typewritten copy of a letter I have just received from Mr. Henfrey, formerly a serjeant-major in our Corps, and afterwards a clerk in the Royal Army Medical Corps Record Office. Whilst there he was offered and accepted a very good position in the Colonial Service, with his wife, as head of a large native asylum in Nairobi, and he has now written me an account of his life out there, and the prospects of ex-soldiers of the Corps who might think of settling in British East Africa. It is such an excellent letter that I believe if you could print it in the Journal it would be of great interest to members of the Corps, especially senior warrant and non-commissioned officers who are about finishing their time, and who are uncertain how to occupy their lives. It also shows what really good positions are open to our ex-soldiers under the Colonial Governments if they choose to take them.

We have several in British East Africa, and also in Nigeria and other parts of West Africa, in Egypt, and the Transvaal, and some in the West Indies, all obtained through our Record Office at Aldershot.

Hoping you will find room for Mr. Henfrey's letter,

I am, &c.,

15, *Gilston Road*,  
*South Kensington.*

E. M. WILSON,  
*Lieutenant-Colonel (retired pay).*

*March 4, 1914.*

"DEAR COLONEL WILSON,—After serving half my engagement, I now feel somewhat qualified to express an opinion in accordance with your wishes, as to the suitability of British East Africa as an opening ground for men leaving the Corps. Nairobi is situated in the highlands 327 miles from the coast, with an altitude of 5,450 feet, and from the asylum on a clear day one can see plainly with the naked eye the snow-capped mountain Kilimanjaro in German East Africa.

"The industry of the highlands is chiefly agricultural; wheat, maize, beans, potatoes, and vegetables of every description are grown in abundance. During the fifteen months I have been here, two good crops have been harvested from the asylum grounds (of which there are about thirty acres under cultivation), and the third crop is now well on its way and I hope will be ready during March. As soon as the crops are gathered, the land will be at once jembed, and reset during the long rains, and the crops should be again ready for harvesting during the latter part of September or early October.

"The East African coffee is, I see by the papers, leading the London market. Several friends of mine who hold land are now putting in coffee for all they are worth, and are looking forward to big results. The black wattle industry seems to be of great importance. This industry is chiefly confined to the highlands, many thousand acres having already been planted as a by-product. The market value of the bark is good, and in addition the poles are largely used for hut building. Many people have great faith in rubber, and there are several large companies in existence. Cotton is largely grown in Uganda, and is exported through East Africa and is a source of labour to the Protectorate. Sawmills, ginning mills, and flour mills have been established. There are large plantations of sisal hemp, equipped with modern machinery for extracting the fibre. Fruits, namely, apples, plums, apricots, and most of the staple varieties of Europe of the finest quality are grown in abundance on the Machaks Hills near Nairobi.

"In cattle farming most astonishing results have been obtained from cross-breeding with the native cow. One can often see herds of half-breeds looking in the pink of condition. English bulls are imported. Sheep farming is a thriving industry. A bacon factory has been established, equipped with up-to-date plant. There is an unlimited demand for this product at fairly good prices. The hams and bacon turned out by this firm are equal to anything I have tasted in England; retail price, 1s. 4d. a pound. Pigs do well in the highlands. Horse and ostrich farming is making headway. The revenue of the Protectorate is steadily on the increase.

"The building industry is good. Large massive stone buildings are going up everywhere, especially in Nairobi. There is a very fine garden city being built about a quarter of a mile from the asylum gate. It has its own club, lit up by electric light, and twenty-three acres of recreation ground, golf, polo, cricket, football, &c. The golf course is without a doubt one of the finest I have seen.

"These industries must of necessity call for a great deal of labour, which cannot be carried on without a certain percentage of Europeans; but at the same time one must not overlook the fact that this is a tropical climate, and that most of the outside skilled labour is performed by Indians, the unskilled by natives, chiefly the Kikuyu, supervised by Europeans. The Protectorate is not ready at present to take any great inrush of immigrants. If one could only prevail upon the men to save a certain amount of their pay weekly, so that at the termination of their engagement they had sufficient to pay their passage to this Protectorate, with a few pounds to spare to carry them on for a little time, I feel very certain a limited number would find ready good and remunerative employment, especially men with some knowledge of a trade or farming. Men who have a weakness for the bottle should on no account come to British East Africa. There are far too many of that class here already. I

honestly think there is an excellent chance for a man with a modest income and a little capital who could take up land and sit tight for a few years. The billets offered to our men in British East Africa by the Colonial Government are really good ones, and are well worth striving for.

"Wishing you the very best of luck and health during 1914,

"I am, dear Sir,

Yours respectfully,

W. HENFREY."

"*Lunatic Asylum,*

*Nairobi,*

*British East African Protectorate.*

*February 8, 1914."*

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### THE STORY OF THE BRITISH ARMY SURGEON.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I shall be glad if you will correct an error in my article on "The Story of the British Army Surgeon," which appeared in the March number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

An error in transcription makes me say *Sir* John Ranby instead of *Mr.* John Ranby. Ranby was never knighted.

I am, &c.,

63, *Denbigh Street, S.W.*

*April 17, 1914.*

H. A. L. HOWELL,

*Major, R.A.M.C.*



Journal  
of the  
Royal Army Medical Corps.

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Original Communications.

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HEAT-STROKE.

FURTHER OBSERVATIONS ON AN ANALYSIS OF FIFTY CASES.

By M. S. PEMBREY, M.A., M.D.

AN analysis of the reports of fifty cases of heat-stroke among British troops in India was given in a recent number of this Journal.<sup>1</sup> It was a preliminary paper and the discussion dealt chiefly with the influence of: (1) Exposure to a high and moist atmosphere; (2) muscular work, and (3) conditions which increase the effects, such as unsuitable clothes, heavy loads, and debility due to alcohol or other causes. It was stated that the direct action of the sun's rays, sweating, treatment, the after-effects, the loss of efficiency and the causes of death would be considered in a subsequent paper. In the present article an attempt is made to fulfil that promise.

*Action of the Sun's Rays.*—There has been, and is still, a widely prevalent view that serious disorder or death may be produced by the direct action of the sun's rays. This view is the basis for the distinction, which is generally made, between "sun-stroke" and "heat-stroke"; thus in the "Nomenclature of Diseases," issued by the Royal College of Physicians of London, in 1906, will be found the following classification: Heat-stroke, coup de chaleur, Hitzschlag; sun-stroke, coup de soleil, Sonnenstich. The term

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<sup>1</sup> August, 1913.

"heat apoplexy" is no longer included in the list. In the "Manual of the International List of Causes of Death," 1912, the following are grouped together: Coup de soleil, heat apoplexy, heat exhaustion, heat prostration, heat-stroke, insolation, solis ictus, sun-stroke, thermic fever, thermoplegia.

The divergence of opinion in the Service may be indicated by the following quotations from recent issues of this Journal. Major Leonard Rogers, I.M.S. [1], says "there are two different conditions produced by exposure to the sun or excessive heat: firstly, syncopal attacks, usually induced by the action of the direct rays of the sun, often aided by excessive exertion, such as when troops march on a hot day; and secondly, hyperpyrexia, following prolonged high atmospherical temperature, with or without exercise, and usually without actual exposure to the sun, such as attacks stokers in ships in hot climates. Intermediate conditions combining some degree of both the above states also occur. As a rule, the syncopal form, or sun-stroke proper, is rapidly recovered from under suitable treatment; but true heat-stroke, with hyperpyrexia and loss of consciousness is a much more serious, and often fatal, condition of common occurrence in certain tropical climates." On the other hand, Colonel R. J. S. Simpson [2] has pointed out that "in practice, at least in the Service, it appears to be the custom to apply the term sun-stroke to the pathological state arising within a comparatively short time after actual exposure to the sun, and the term heat-stroke when this antecedent is absent. . . . But there is so much confusion in the nomenclature of these pathological states that a comparison of the relative proportions of each type of disease in each of the various groups does not appear to be profitable." A more forcible expression of opinion is that of Major W. H. Ogilvie, I.M.S. [3], "If the victim was bowled over in the sun, the case is sun-stroke, if he was in the shade it is heat-stroke, the symptoms being identical in both cases."

These quotations are sufficient to show the unsatisfactory condition of a question which has been complicated still further by the view of Sambon [4] and Manson [5] that heat-stroke is an infective disease. The question must be settled by observation and experiment. There is no doubt that the sun's rays have a direct action upon the body, but sunburn and other inflammatory conditions of the skin are of an order different from sun-stroke. The actinic power of the sun is greatest at high altitudes, or in dry localities in the Tropics, whereas sun-stroke is most prevalent in atmospheres which are both hot and moist. The pigmentation of the skin

protects the body against the injurious action of certain rays of the sun. A negro can withstand exposure to intense sunlight which would be intolerable to a white man unprovided with clothing. This is not a simple question of exposure to heat, for it has been found that as stokers on board ship coloured men are not superior to the white man in resisting the combined effects of heat and moisture. Comparative experiments made by Eijkmann [6] upon the skins of Europeans and of Malays living in the Tropics, show no difference in the radiation of heat, but a greater absorption of heat in the case of the brown skin of the Malays. These results receive confirmation from the observations of Aron [7], who points out that the greater absorption of heat by the pigmented skin appears to evoke an earlier activity of the sweat glands. There is little doubt that the pigment gives protection against the ultra-violet rays, but not against the heat rays. Pieces of frog's skin placed over sensitive photographic plates demonstrate that the pigmented tissue is very effective in absorbing the chemically active rays of light.

The question of clothing in the Tropics has attracted considerable attention, and orange-red material has been used to exclude the actinic rays of the sun. Comparative tests [8] have been made with orange-red and white clothes by the United States Army in the Philippines. One group of 500 soldiers wore the special under-clothing and a similar number were supplied with white under-clothing for the purpose of control. The orange-red clothing was heavier than the white and increased the discomfort produced by heat. The conclusions drawn from the experiments were that the effects of the climate in the Philippines can be, and probably are, produced by moist heat, and even if the actinic rays of the sun had any influence they were sufficiently excluded by the khaki uniform and the campaign hat.

For several years the therapeutical use of different rays of light has been extensive, but no case showing symptoms resembling those of sun-stroke has been recorded.

Aron has shown by interesting experiments upon animals and by observations on men, both white and coloured, that exposure to the direct rays of the sun will raise the temperature of the skin above the internal temperature of the body. Monkeys indigenous to the Tropics can be killed by exposure to the sun and death appears to be due solely to the abnormal rise in the temperature of their bodies, for if a sufficient ventilation is maintained over the body the animal shows no bad effects even if its head be exposed for hours to the full force of the sun's rays.

A critical examination of the evidence indicates that the actinic rays of the sun are only an indirect factor in the causation of heat-stroke. The white man is forced to protect his skin from the action of the sun's rays by clothing, and thus, as regards the loss of heat from his body, places himself at a disadvantage; he sweats extravagantly, for much of the moisture is absorbed by his clothing and is not directly used for cooling the body by evaporation. The coloured man sweats economically owing to his scanty clothing; he can be placed at a disadvantage by unsuitable uniform, and it is well known that native troops in India are liable to heat-stroke when they are wearing uniform and marching in close order on a hot day.

The effect of the glare of the intense sunlight upon the eyes may be a contributory factor, for in many people intense headache is produced thereby. In this respect subjects with blue eyes appear to suffer more than those with dark eyes.

*Sweating.*—For many years it has been known that a man can maintain his normal temperature when he is living in a dry atmosphere, the temperature of which is above that of his body. Under such conditions he does not lose, but gains heat by radiation and conduction. His temperature does not rise; it follows, therefore, that he must possess some efficient means of cooling his body, for in addition to the heat gained from the air he must, as long as he lives, produce heat by the essential processes of combustion within his tissues. A man receiving an adequate diet and doing moderate work produces about 3,500 calories in twenty-four hours: in order to neutralize this heat by evaporation alone he would require to drink about 6 litres ( $1\frac{1}{4}$  gallon) of water to replace the water lost from his body.

On these points Hunt [9] made observations in the Deccan, where during the hot weather the daily maximum temperature of the air is about 100° F. (38° C.) and in some parts is as high as 110° F. (43° C.) for long periods. The temperature indicated by the wet bulb thermometer was generally between 65° and 70° F. (18° to 21° C.), showing a very low percentage of moisture. No great discomfort was felt by healthy Europeans, and fairly hard muscular work was possible in the open air, even when the temperature in the shade was 110° F. (43° C.). The average amount of liquid taken daily by each of three men who were observed while living an active outdoor life during very hot weather was  $13\frac{1}{2}$  litres (3 gallons) or more. In such extremes of dry heat the cooling produced by the evaporation of sweat is the safeguard against heat-

stroke and it is interesting to note that Hunt did not see, during his duties as medical officer, any case of pure heat-stroke or sun-stroke.

As an example of the importance of sweating may be given the following data taken from the reports [10] of the experiments performed at Aldershot. Four men during a march of seven miles in drill order lost by sweating an average of over 3 pints (1,816 grm.) of water, the maximum loss being over 4 pints (2,390 grm.) and the minimum over 2 pints (1,200 grm.). It was a hot day in September when the temperature of the air by the dry and wet bulb thermometers was 79° F. (26·1° C.) and 67·5° F. (19·7° C.) respectively, and there was at times a south-west breeze. In the same series of experiments the influence of load, clothing, and training, as well as the effects of different conditions of external temperature, moisture, and wind, were determined. Further reference to these subjects will be made when the question of the prevention of heat-stroke is considered.

The healthy body maintains its percentage of water at a constant level, and any excessive loss by sweating must be compensated sooner or later by drinking. According to Hunt's observations the percentage of water in the blood is not appreciably diminished, even when several litres of water have been lost by sweating. The reserve of water in the body appears to be stored in the muscles and skin and is only slowly replenished by drinking. It is unwise, therefore, to restrict drinking; a normal thirst is the call for water to maintain the reserves in the tissues.

It has been noted over and over again that in cases of heat-stroke the skin is dry, whereas in cases of heat-exhaustion the skin may be covered with sweat. The regulation of sweating, which is an active secretory process, appears to be controlled by the nervous system and the temperature and chemical composition of the blood. The secretory system may be paralyzed and in such cases increased vascularity and temperature of the skin are not accompanied by sweating. In some fevers this condition appears to be due to the action of the toxic products of pathogenic micro-organisms, and it is possible that some unusual product of metabolism acts in this way in heat-stroke.

*Treatment.*—There is general agreement that the most successful treatment of heat-stroke is the application of cold by means of baths, douches or sponging with cold or iced water, by the wet pack, and iced enemata. The credit of the introduction of these methods appears to be due almost entirely to the Medical Service of the Army.



In all but four of the fifty cases now under review this treatment was employed; of the exceptions two were found dead, another was a cardiac case with definite post-mortem evidence of endocarditis, and another died a few minutes after admission to the hospital. In many cases a dose of calomel was given on admission. It is interesting to note in confirmation of previous results that diaphoretics failed.

The iced enemata, originally suggested by Parkes, appear to be especially useful in those severe cases in which the circulation of the blood through the skin is so defective that the blood cooled at the surface is not exchanged rapidly enough for the heated blood of the internal organs. The application of ice to the head and neck seems to give prompt results owing probably to the fact that the high temperature especially affects the brain.

The success of the treatment by cold is strong evidence in favour of the view that heat-stroke is due to a disordered regulation of temperature produced by heat; the failure of antipyretic drugs can be considered as evidence against the bacterial theory of Sambon.

*The After-effects.*—The records of the fifty cases relate to the period spent in hospital; for this reason they are too short to serve as a correct guide to the after-effects of heat-stroke. In the reports of thirty-eight out of the forty patients who survived it is stated that there were no after-effects: in one an absence of sweating is noted, and one man showed such marked wasting of muscles with double ankle drop that he was invalided.

The widely prevalent idea that the nervous system is more unstable after heat-stroke would appear to be supported by what is known of the effects of a high bodily temperature upon the nerve-cells.

*Loss of Efficiency.*—The records of these fifty cases give an estimate of the loss of efficiency from heat-stroke, but it is an underestimate. There were ten deaths, and it is of interest to note the age, service, and rank of the men.

It will be noted that the fatal cases are not among the young men of short service in India. From the physiological point of view this might be expected, for there appears to be no reason why a young healthy man should not accommodate himself to the effects of heat as readily as, or even more readily than, older men.

The minimum value for the days lost by the forty men who recovered is 605, giving an average of fifteen days for each man;



the shortest time was two days, the longest with recovery thirty-nine, the longest before invaliding ninety-three days. In as many as twenty-seven cases it is mentioned that the men were sent to the Hills after discharge from the hospital and this excellent precaution at first sight suggests an additional loss of efficiency.

Rank		Age		SERVICE		
				Total		In India
Drummer	..	35 years	..	Not given	..	3 $\frac{1}{2}$ years and 3 $\frac{1}{2}$ in South Africa
Bombardier	..	28	..	9 years	..	Not given
Saddler..	..	32	..	7	..	4 years
Sergeant	..	30	..	12 $\frac{1}{2}$	..	10 $\frac{1}{2}$ ..
Private..	..	21	..	Not given	..	2 $\frac{1}{2}$ ..
Private..	..	25	..	..	..	4 $\frac{1}{2}$ ..
Lance-Corporal	..	28	..	9 years	..	5 $\frac{1}{2}$ ..
Corporal	..	27	..	13	..	2 $\frac{1}{2}$ ..
Private..	..	41	..	14	..	2 $\frac{1}{2}$ ..
Private..	..	32	..	13	..	Not given

The present fifty cases were reported in the British Army in India between June 24, 1909, and August 22, 1910. The table on pp. 636 and 637, prepared by the War Office at the suggestion of Sir Alfred Keogh, shows the returns for the ten years 1902-1911 and gives more extended data for an estimation of the serious loss from heat-stroke.

*Causes of Death.*—The ordinary methods of a post-mortem examination do not show any characteristic condition in the bodies of those who have died from heat-stroke, and owing to the rapidity of decomposition in the tissues a microscopic examination is beset with sources of error. Some observers [11] have found marked changes in Nissl's granules and in the nuclei of the nerve cells of the central nervous system. Halliburton and Mott [12] showed by experiments that the globulin of these cells will coagulate at 42° C. if that temperature be maintained for some time.

Death appears to be due to the effect of the high temperature upon the nervous system and the heart. The proteins of the nerve cells may be coagulated and a partial coagulation of the proteins of the respiratory and cardiac muscles may assist in the production of failure of respiration and of the heart.

If exact knowledge is to be obtained an examination directly after death is necessary. Further experiments upon animals will be needed if progress in the knowledge of the condition is to be more rapid.

*Prevention.*—If heat-stroke is a disordered regulation of temperature, due to exposure to a high temperature, the methods of prevention are clearly those directed to diminish the production and increase the loss of heat. Muscular work increases the production of heat and the activity of the heart; the greater the load the greater the effect. Unsuitable clothing by preventing the cooling effect of sweating diminishes the loss of heat. A man can work hard on a hot day if the air be not too moist, but he must cool his body by sweating freely and must drink copiously in order to maintain the reserves of water in his tissues. Progressive training results in the economical performance of work

	1902						1903						1904						1905					
	Heat-stroke		Sun-stroke		Heat apoplexy*		Heat-stroke		Sun-stroke		Heat apoplexy		Heat-stroke		Sun-stroke		Heat apoplexy		Heat-stroke		Sun-stroke		Heat apoplexy	
	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths
United Kingdom	7	—	7	—	—	—	—	—	4	—	2	—	4	—	17	—	2	—	9	—	8	1	1	—
India .. ..	107	22	24	2	40	22	193	20	52	9	58	24	109	19	169	1	37	14	304	29	99	3	66	23
Colonies .. ..	13	3	45	2	4	1	24	2	40	1	17	5	28	3	41	1	—	—	18	3	11	—	1	1
Total whole Army	127	25	76	4	44	23	217	22	96	10	77	29	141	22	227	2	39	14	331	32	118	4	68	24
Total admissions	247						390						407						517					
Total deaths ..	52						61						38						60					

\* The classification under "Heat apoplexy" was dropped after 1906.

even under adverse external conditions which are beyond the control of man. The countermanding of marches on a hot day is not the height of efficiency, for in warfare it may be imperative to perform a forced march on a hot day. Efficiency is found in the recognition of dangers and the capacity to escape or mitigate them by intelligent precautions. The guidance afforded by the wet bulb thermometer is more important than that of the dry bulb. Further attention might be drawn to its indications, which would serve as a warning for special precautions by night as well as by day. There is no doubt that a hot, moist, and stagnant atmosphere is especially distressing at night; it would seem that the nervous control of the temperature of the body is less perfect during



sleep, especially in those who are unwell or under the influence of alcohol.

These are old-fashioned truths, which have always received recognition in the Medical Service of the Army. In discussing the question of the prevention of heat-stroke, Sir James Ranald Martin [13] wrote: "Parades, formalities, the majestic English march, 'Regulations,' and appearances, must here be utterly and at once discarded, for it is a question of life and death. The open, disorderly looking order of march, however slovenly it may seem to the lieutenant-colonel, must here be used, the close order being nothing short of stifling and sickening the men 'by Regulation.'

1906						1907				1908				1909				1910				1911			
Heat-stroke		Sun-stroke		Heat apoplexy		Heat-stroke		Sun-stroke		Heat-stroke		Sun-stroke		Heat-stroke		Sun-stroke		Heat-stroke		Sun-stroke		Heat-stroke		Sun-stroke	
Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths
33	2	15	—	—	—	5	—	8	—	26	—	17	1	6	—	2	—	5	—	7	—	45	—	7	1
186	32	143	—	22	7	111	13	51	—	157	36	46	1	75	15	30	—	78	7	15	—	200	23	54	1
67	2	9	—	1	—	73	1	5	2	34	2	2	—	55	2	6	—	39	—	1	—	15	—	7	1
286	36	167	—	23	7	189	14	64	2	217	38	65	2	136	17	38	—	122	7	23	—	260	23	68	3
476						255				282				174				145				328			
43						16				40				17				7				26			

The genius of pipeclay must here concede something." Close order means a hot moisture-laden atmosphere, and an uneconomical expenditure of muscular and nervous energy in maintaining rank.

Unfavourable comment appears to be justified in only three of the cases now under discussion. Three soldiers, convalescents for the Hills, were marched at 1.15 p.m. in full marching kit (without overcoat) from the barracks to the railway station, a distance of about a mile and a half. The temperature of the air was 109° F. (42.8° C.) by the dry bulb, and 85° F. (29.4° C.) by the wet bulb thermometer. After arrival at the railway station these men collapsed with heat-stroke. Men who are slightly unwell are liable to heat-stroke. In twenty of the cases the reports show that

the men had been in this condition before the attack. Alcohol appears without doubt to be a factor, and this opinion of the older writers is confirmed by the present reports.

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## THE ELECTRON, ATOM, AND MOLECULE.

By COLONEL R. H. FIRTH.

THAT certain very notable advances in physics have been made in recent years is known to every reader of this Journal. The inner meaning and nature of those advances are probably imperfectly understood by the majority, partly on account of their technicality and partly owing to the literature concerning them being somewhat inaccessible. This article is a somewhat ambitious attempt, by a non-physicist, to explain the new facts and conceptions in simple and non-technical language.

To those of us who were educated on the old ideas, the atom was a conception representing the smallest mass of an element capable of taking part in a chemical reaction. We regarded it as homogeneous and indivisible. That view has now to be discarded, and the atom conceived as something like a planetary system on an infinitesimal scale. In compounds, the atoms of the different elements were supposed to be grouped together into similar particles or molecules, the ratio of the masses of the components being the same in each individual molecule as in the compound as a whole. We have now to assume that, even in the elements, the atoms are connected usually into groups of two or more to form a larger particle, which, unless taking part in a chemical reaction, always moves and acts as a single system. The number of these particles or molecules in any visible piece of matter is, of course, enormous, and their size correspondingly minute. It is almost hopeless to attempt to conceive the innumerable swarm of molecules, in say a cubic millimetre of air; but it may be of some assistance to mention that in the highest vacua, when the pressure of the gas is not more than one ten-thousandth of a millimetre of mercury, the number of molecules present in each cubic millimetre of the space still exceeds two thousand millions. It is hopeless to try and conceive what are the numbers of molecules present in the same volume of air under normal conditions. The extreme minuteness of these molecules is equally difficult to appreciate, but it may be conceivable if we imagine a drop of water to be magnified to the size of the earth, then the molecules in it would be of the size of ordinary footballs.

In a solid, we must regard the molecules as relatively fixed, but they are really in rapid vibration about their mean position, such

atom. The high velocities of both kinds of particles give them sufficient energy to produce luminous effects when they fall on suitable screens, and the fact that they carry an electric charge permits of their velocity being calculated and also the ratio of the mass of the particles to the charge which they carry.

The principles, on which these calculations are made, are as follows : If a particle has a mass  $m$  and an electric charge  $e$  and be moving with a velocity  $v$ , then in one second the charge  $e$  will have moved through a distance of  $v$  cm. This term of  $v$  cm. is therefore a kind of conductor carrying an electric current whose strength is  $e$ . Now, by the laws of electro-magnetic induction, the mechanical force on such a conductor, when it is placed in a magnetic field, is known to be equal to the strength of the field multiplied by the current and the length of the conductor. If the strength of the magnetic field be  $f$ , then the mechanical force is the product of  $f.e.v$ . Further, this force is always at right angles to the direction of the current and to the lines of force in the magnetic field. In these circumstances, the path of the particle is changed from a straight line to a circle described in a plane at right angles to the lines of force in the magnetic field. If the radius of that circle be  $r$ , it follows that, for equilibrium to be attained, the force tending to urge the particle away centrifugally must equal the force due to the magnetic field tending to draw it in, and an equation results as follows, or  $\frac{m}{e} v$  equals  $f.r$ . But the particle carries an electric charge, therefore it can be deflected by an electric field. If we say that the strength of that field be  $E$ , then the force experienced by the particle is  $Ee$  and this acts upon the particle in the direction of the lines of electric force. If an apparatus be arranged so that the electric and magnetic fields are at right angles to each other, the forces upon the particle, due to the two fields, will act along the same straight line and, by proper adjustment, the two forces can be made to oppose each other. If this be done, a value for the electric field can be found such that the two forces just neutralize each other, and the particle goes on its way without deflection. When this is so, then  $f.e.v$  equals  $Ee$  and, consequently,  $v$  equals  $\frac{E}{f}$ . It follows from this that if, to the moving electrified particle, electric and magnetic fields be applied simultaneously of such magnitudes that the particle goes straight on without deflection, the ratio of the strengths of the two fields will give the velocity of the particle. Having thus obtained the value of  $v$ , if we measure the radius of the circle into which the path of the particle was bent by the



moving electrified particles, and from them came the discovery that the most conspicuous set of particles in a discharge tube were those constituting the kathode rays, which particles are now known to have a mass of not more than one eighteen-hundredth of that of a hydrogen atom. These kathode particles or corpuscles are now called electrons and must be regarded as forming an integral part of the atom of every kind of substance, being more fundamental than the atom itself, and forming part of the material from which the atom is built up. Moreover, it was discovered that no matter what is the nature of the gas in a discharge tube, and no matter what is the nature of the electrodes used, the mass of the kathode particle produced and the magnitude of the charge carried by it is always the same.

Having made these preliminary observations, we may proceed to consider the physics of the electron. To understand these, it is necessary to refer to the phenomena of a discharge tube, whose appearance must be familiar to all. When a discharge is passing through the tube, the kathode is covered with a glow, beyond this is a dark area called the Crookes dark space which, if the pressure in the tube be high, may be so thin as to be hardly visible. Beyond this dark space comes another luminous area or the negative glow, followed on the side remote from the kathode by another dark or obscure area, known as the Faraday dark space. If the pressure in the tube be low, there may be seen proceeding from the kathode a number of straight lines of bluish light, known as the kathode rays. As the pressure in the tube falls, these rays excite a phosphorescence where they fall upon the glass walls of the tube; gradually, the dark space in the tube increases until there remains only the glow on the kathode and a small patch of light near the anode. It was soon found that the kathode rays carried a negative charge of electricity, and consisted of streams of negatively charged particles moving at enormous velocities. Now, if an obstacle be placed in the dark space of a discharge tube a shadow is thrown upon the kathode. This indicates that there must be rays in the tube travelling in the opposite direction to the kathode rays and falling upon the kathode itself. By using a perforated kathode, these rays pass through the kathode and become visible as faintly luminous streaks of light and producing a mauve phosphorescence where they strike the walls of the tube. These rays carry a positive charge of electricity and have a mass comparable with that of an atom, whereas the negatively charged particles going in the other direction have a mass much less than that of a hydrogen

atom. The high velocities of both kinds of particles give them sufficient energy to produce luminous effects when they fall on suitable screens, and the fact that they carry an electric charge permits of their velocity being calculated and also the ratio of the mass of the particles to the charge which they carry.

The principles, on which these calculations are made, are as follows: If a particle has a mass  $m$  and an electric charge  $e$  and be moving with a velocity  $v$ , then in one second the charge  $e$  will have moved through a distance of  $v$  cm. This term of  $v$  cm. is therefore a kind of conductor carrying an electric current whose strength is  $e$ . Now, by the laws of electro-magnetic induction, the mechanical force on such a conductor, when it is placed in a magnetic field, is known to be equal to the strength of the field multiplied by the current and the length of the conductor. If the strength of the magnetic field be  $f$ , then the mechanical force is the product of  $f.e.v$ . Further, this force is always at right angles to the direction of the current and to the lines of force in the magnetic field. In these circumstances, the path of the particle is changed from a straight line to a circle described in a plane at right angles to the lines of force in the magnetic field. If the radius of that circle be  $r$ , it follows that, for equilibrium to be attained, the force tending to urge the particle away centrifugally must equal the force due to the magnetic field tending to draw it in, and an equation results as follows, or  $\frac{m}{e} v$  equals  $f.r$ . But the particle carries an electric charge, therefore it can be deflected by an electric field. If we say that the strength of that field be  $E$ , then the force experienced by the particle is  $Ee$  and this acts upon the particle in the direction of the lines of electric force. If an apparatus be arranged so that the electric and magnetic fields are at right angles to each other, the forces upon the particle, due to the two fields, will act along the same straight line and, by proper adjustment, the two forces can be made to oppose each other. If this be done, a value for the electric field can be found such that the two forces just neutralize each other, and the particle goes on its way without deflection. When this is so, then  $f.e.v$  equals  $Ee$  and, consequently,  $v$  equals  $\frac{E}{f}$ . It follows from this that if, to the moving electrified particle, electric and magnetic fields be applied simultaneously of such magnitudes that the particle goes straight on without deflection, the ratio of the strengths of the two fields will give the velocity of the particle. Having thus obtained the value of  $v$ , if we measure the radius of the circle into which the path of the particle was bent by the

action of the magnetic field alone, we can from the equation  $\frac{m}{e} v$  equals  $f \cdot r$  determine the value of  $\frac{m}{e}$  or the ratio of the mass to the charge. This ratio is of the utmost importance in molecular physics, and for hydrogen in absolute electro-magnetic units the value of  $\frac{m}{e}$  is 0.000109 or rather more than  $10^{-4}$  gram. per absolute electro-magnetic unit of charge. To avoid confusion of ideas as to electric magnitudes, it is necessary to know that there are two systems of units in current use; one in terms of electrostatic units, founded on the strength of the force with which two similar charges repel each other, and the other founded on considerations of the induction of currents by magnets. This latter is the absolute electro-magnetic system of units and, so far as possible, will be used in this article. Further, one may say that the volt is  $10^{-8}$  and the ohm is  $10^{-9}$  absolute electro-magnetic units and, consequently, the ampere and coulomb are one-tenth of the absolute units of current and charge.

On the basis of the principles outlined above many exact experiments have been made and the velocity of negatively charged particles or electrons found to range from a tenth to a fifteenth of the velocity of light, say,  $3 \times 10^{-9}$  cm. per second. Similarly, the value of  $\frac{m}{e}$  or the electro-chemical equivalent of the electron has been found to be always the same, namely,  $5.65 \times 10^{-6}$  gram. per unit of charge. For the hydrogen atom, its value is about  $1.04 \times 10^{-4}$ , hence the electron must be only about one eighteen-hundredth part of that of the hydrogen atom. A serious difficulty was long experienced as to measuring the magnitude of the electronic charge of  $e$ . It was overcome by utilizing the discovery that, if a space saturated with aqueous vapour be chilled suddenly, the surplus water over and above that which would saturate the space at the lower temperature separates out as a mist or cloud, and that each drop or particle of water had an ion as its nucleus on which it condensed. It was further discovered that these ions bear the same electric charge as the electrons which gave rise to them, that is, the ionic charge is the same as the electronic charge,  $e$ . By calculating out the electric charge on each particle of water, the value of the charge on the original electron was deduced. The mean value was found to be  $4.7 \times 10^{-10}$  electrostatic units, or  $1.57 \times 10^{-20}$  coulombs in terms of the absolute electro-magnetic unit of charge. Combining the results obtained, the conclusion is formed that, whatever the source from which they come, all electrons have identically the same mass of  $8.8 \times 10^{-28}$  gram. and an electric charge of

$1.57 \times 10^{-20}$  coulombs, and that it is such particles that form a constituent part of all matter.

At this stage it is necessary to go back to the positively charged particle which we mentioned as being found in discharge tubes and which are projected also at very high velocities from radium and other radio-active substances. Now, this positive particle differs from the electron or negatively charged particle in the cathode rays, in that it has a mass comparable to an atom. Further, it may be stated here that no positive charge has yet been detected in association with any mass less than that of a hydrogen atom. The electric charge on a positive particle is either of the same magnitude as that on an electron or some simple multiple of it. The  $\alpha$  rays or particles from radio-active substances always carry a charge of  $2e$ ; in discharge tubes, however, positive particles are found carrying charges in all integral multiples up to  $8e$ . The inference drawn is that the positive particles are really atoms travelling at high velocities, and from which one or more electrons have been removed. The positive particle can be deflected by electric and magnetic fields in the same way as the negative electron, and obeys the same laws. The deflection is always in the opposite direction to that of the electron and, owing to the greater mass, this deflection of the positive particle is less than that for a similarly moving electron.

If  $e$  be the electric charge on a single positive particle, the total charge carried by  $N$  particles is  $Ne$  and, if  $N$  be sufficiently large, this charge will be directly measurable by an electroscope or electrometer. If, further, the number of particles carrying the charge can be determined, the value of the individual charge  $e$  is readily deduced. The experimental observations are best performed using the  $\alpha$ -particles from polonium or radium, or some other radio-active substance. The apparatus involved in these observations is both ingenious and complicated, but the counting arrangement is simple. It consists of a long tube, closed at one end by a brass plate perforated by a hole, a centimetre in diameter. Across the hole is sealed a thin glass cover-slip bearing on its under surface a fluorescent screen of willemite. The  $\alpha$ -particles are given off from a piece of polonium or radium, suitably mounted and placed at a known distance from the screen. If a high-power microscope be focused on the screen, the scintillations, numbering about one every two seconds, are easily counted and the total estimated for the whole area of the screen. The electric charge is measured by a Faraday cylinder and an electroscope. The results show

the charge  $e$  on the positive particle to be  $9.58 \times 10^{-10}$  in electrostatic units or  $3.16 \times 10^{-20}$  in electro-magnetic units. These numbers are practically twice the value of the electronic charge; therefore, the charge on the positive or  $\alpha$ -particle is twice that on the electron, and the  $\alpha$ -particle is held to be an atom which has lost two electrons. These values are characteristic of all  $\alpha$ -particles from radio-active substances, and they differ from each other only in respect of their velocity.

The ratio of the mass to the charge can be determined in the same way for the  $\alpha$  or positive particle as for the electron. According to Rutherford, this ratio of mass to the electric charge is  $1.97 \times 10^{-4}$  for the  $\alpha$ -particle, and as it carries two charges it is spoken of as electrically di-valent. Now as the ion in solution carries the same electric charge as the electronic charge  $e$ , and the electro-chemical equivalent or ratio of mass to charge for hydrogen is  $1.04 \times 10^{-4}$ , it is calculated that the atomic weight of the  $\alpha$ -particles is 3.96, which is the atomic weight of helium. For this reason, the  $\alpha$ -particles are presumably atoms of helium. The proof of this has been furnished by Rutherford, who used as the source of  $\alpha$ -particles the substance known as radium emanation or that radio-active gas which is the first decomposition product of radium and now called niton. After purification, some of this gas was sealed in a thin-walled glass tube. This was next enclosed in a larger thick-walled glass tube which, also being made quite air-tight, had fitted in its upper part two electrodes. The spectrum of the discharge between these electrodes gives the nature of any gases in this outer tube. As there is no connexion between the inner and outer tubes, nothing could pass from the one to the other except the  $\alpha$ -rays enclosed originally in the inner tube. When the inner tube was filled with radium emanation, the  $\alpha$ -particles emitted therefrom passed through the thin glass walls and collected in the space between the two tubes. On passing a discharge through the outer tube, a complete spectrum of helium gradually appeared, leaving no doubt that the  $\alpha$ -particles were and are atoms of helium, differing from the ordinary atoms of the gas only in their velocity and electric charge.

The principles here outlined have a wide application as they permit of the calculation of the actual mass of any atom of which the chemical atomic weight is known. We have seen that the value of the electronic charge is  $4.7 \times 10^{-10}$  electrostatic units or  $1.57 \times 10^{-20}$  electro-magnetic units, also that the ratio of the mass to the charge for the hydrogen atom is  $1.04 \times 10^{-4}$ ; consequently,

the mass of the hydrogen atom is  $1.04 \times 10^{-4}$  times the electronic charge, or  $1.63 \times 10^{-24}$  grm. This is obviously the value in grammes of the chemical unit of atomic weight, and from it the actual mass of any atom, of which the chemical atomic weight is known, can be calculated at once. The accuracy of the result depends only on the accuracy with which the value of the electronic charge  $e$  has been determined. Further, certain later developments of these methods in the hands of J. J. Thomson, lend them to both qualitative and quantitative determinations of traces of gaseous substances, too small to be detected by the spectroscope. The procedure may be summarized as follows: When the two electrodes of a discharge tube are connected to the poles of an induction coil, the molecules of a rarefied gas in the tube are subjected to a very high electric tension. This tension acting on the negatively charged electrons, which we know are in all atoms and molecules, causes one or more of them to be detached from the molecule, leaving the remainder positively charged. This positive particle, as it now is, is driven with great velocity towards the kathode by the action of the electric field which produced it. If the kathode be suitably perforated the positive particle will pass through it, with its velocity unimpaired, and be detected either on a fluorescent screen or, preferably, on a photographic plate where it will leave a permanent record as a parabolic curve for measurement with suitable instruments of precision. The method is still in the experimental stage, but the results, so far, are highly suggestive of the greatest value.

It will be sufficiently well understood that electrons are contained in all atoms, and many phenomena suggest that the electrons play a dominant part in determining both the chemical and physical properties of substance. If it be asked, what is an electron? the answer is, it is an atom of electricity free from association with anything in the nature of matter as we know it. Not merely has it a charge of electricity, it is a charge and, apart from that charge, has no existence and no properties, not even of mass. This may seem a somewhat sweeping statement, but there is experimental proof of its accuracy. In the first place, though we have shown that the mass of the electron has been determined, it is necessary also to show that such a moving charge of electricity possesses mass, a property hitherto associated only with what is ordinarily called matter. The proof is obtainable from the laws of electric and magnetic induction. Imagine a small sphere, charged with either positive or negative electricity, moving through space with



a given velocity. Such a moving sphere will be equivalent to an electric current element coinciding with the path of the particle. By the usual laws of electro-magnetic induction, this current element will produce a magnetic field at a definite distance from the particle. Thus the moving particle will be surrounded not only by an electrostatic field due to its charge, but also by a magnetic field due to the motion of that charge. This field has its greatest value in a direction at right angles to the motion of the particle and is zero in the direction in which the particle is moving. Now the magnetic field is the seat of energy, and the total energy of the magnetic field, surrounding the particle or sphere, is the sum of the energy of all the minute volumes from the surface of the particle away to infinity. In addition to this, there is a quantity of energy due to the charge itself, and which is called the extra or electrical mass, so that the total energy of the moving sphere or particle and its charge is of twofold origin, namely, the mechanical mass and the electrical mass. Even if the mechanical mass be zero, the electrical mass due to the moving charge will persist. In mathematical terms, even if the electron be a pure electric charge, unassociated with any mechanical mass, it will have an electrical mass equal to twice the electrical charge divided by three times the radius of the magnetic field.

Since the electrical mass is really that of the magnetic field surrounding the particle, it resides not in the particle itself but in the medium surrounding it, that is in what, for want of a better name, we call the æther. The moment the particle moves, this energy from the magnetic field flows into it from all sides, so that, to all intents and purposes, any attempt to move the particle gives results precisely the same as if the energy were permanently in the particle. The conception is both new and difficult, but it may be clear if we imagine a body moving through water. If it be a sphere, it carries along with it an amount of the liquid equal to half its own volume. If it be a long cylinder, open at both ends, moving at right angles to its own length, it will carry with it a quantity of fluid equal to its own volume. If, however, the cylinder moves in the direction of its own axis or length, then the fluid entangled with it is *nil*. It is further obvious that to set the sphere or cylinder in motion with any given velocity, an amount of energy must be supplied to give the required velocity, not only to the sphere or cylinder itself, but also to the mass of fluid which it carries with it. In other words, the sphere or cylinder will behave as if its mass were increased by the mass of fluid entangled

by it and, just as in the electrical problem, this extra mass resides in the surrounding medium and makes itself apparent at the surface of the sphere or cylinder when the motion of those bodies is altered in any way.

This analogy of thinking of an electric field in terms of tubes or cylinders we owe to Faraday, but he used it in a sense different to that consistent with modern knowledge. According to Faraday, the cylinders were in a state of tension so that they tended to shorten themselves, and that every positive charge was the beginning of a series of cylinders or tubes of force stretching out through space till they ended upon an equal but opposite charge. Since the attraction between two oppositely charged bodies was the result of the tendency of the tubes connecting them to contract, the repulsion between two like charges was due to the mutual repulsion between the tubes of force radiating from each of them. It followed, that an electric current was the motion of one of the ends of the tubes of force along the conductor, while the magnetic effect was due to the motion of the tubes of force through the surrounding medium. Let us add to Faraday's idea and assume that a cylinder of electric force when moving through the æther is able to hold on to a certain quantity of that fluid, much in the same way as a cylinder moving through oil or water carries along with it a definite mass of the liquid through which it is moving. If we imagine a single charged particle located at some distance from any other attracting body, the lines of electric force will radiate out from its surface and, owing to their mutual repulsion, they will space themselves evenly round it, like so many quills or bristles. If we conceive a sphere of this kind, with its tubes of force radiating out like bristles from its surface, to be moving through space, the cylinders, or tubes, or bristles which are moving at right angles to their length will hold on to the maximum amount of the æther through which they are moving, while those moving along an axis corresponding to their length will carry none. The electrical mass of this hypothetical particle will then be the mass of æther entangled or gripped by the tubes, cylinders, or bristles radiating from it. Now, it is a well-known fact that a cylinder or rod moving in a fluid in the direction of its own length is not in stable equilibrium, but tends to turn so as to offer the greatest resistance possible to the motion, that is, it tends to put itself at right angles to the direction in which it is compelled to move. It follows, that the cylinders or bristles, radiating from our hypothetical moving sphere, which are moving in the axis of their own

length, will tend to turn to what we may call the equatorial plane. But this movement will, to a great extent, unless the velocity of movement be very high, be neutralized by the repulsion between the different bristles or tubes of force. At high velocities, however, there will be a very definite displacement of the bristles or lines of force into the equatorial plane. Further, as the mass of æther entangled by the bristles or tubes is greater in the equatorial plane, it follows that the electrical mass of such a sphere or particle depends mainly upon the velocity at which the particle is moving.

The critical reader will say, surely this variation of electrical mass with speed must depend to some extent upon what assumption we make as to the distribution and geometrical configuration of the electrical charge, or what ideas we have as to the shape of the electron and the way its charge is arranged. This is true, but mathematical analyses of the question show that the differences are so small as to make the value of geometric configuration of the electron a negligible factor. We have seen that the total mass of an electron is made up of two parts; its mechanical mass, which is constant and independent of any velocity at which it is moving, and an electrical mass, which increases with the velocity in the way just explained. If the electrical mass of an electron is small compared with its mechanical mass, then an increase of velocity will have little effect on its total mass. On the other hand, if the whole mass of the electron is electrical in nature, the total mass will increase definitely with velocity. If part of the mass is mechanical and part is electrical, any increase of the total mass with increase of velocity must be intermediate in value. The determination of this question has been the object of many experiments, chiefly with the *b*-particles from radium which, owing to their presenting only one corresponding value for mass for every value of velocity, lend themselves peculiarly well for the purpose. The results show that the mechanical mass of the electron is almost negative; absolutely negative, of course, would be an impossibility, but so small as to be negligible and justifying the conclusion that the whole mass of the electron is electrical in origin and due entirely to the charge it carries. Also, that for a given electrical charge the electrical mass is inversely proportional to the radius of any sphere upon which it is concentrated. Accepting this conclusion, we are in a position to consider what is the size of the electron, and so complete our review of its nature and properties.

Going back for a moment, it has been stated that the total mass

of the electron is  $8.8 \times 10^{-28}$  gm. and that the value of the electrical charge it carries is  $1.57 \times 10^{-20}$  coulombs or electro-magnetic units; it was also stated that the value of its electrical mass is equal to twice the electrical charge divided by three times the radius of the magnetic field. Substituting these values in certain formulas, the mathematics of which we need not discuss, it is found that the radius of an electron is practically  $1.87 \times 10^{-13}$  cm. The exceeding minuteness of this magnitude it is difficult to conceive.

The reader who has grasped the facts which indicate that the whole mass of an electron is practically due to the electrical charge which it carries, may be tempted to ask, are there two kinds of mass or is all mass originally electrical? The exact answer is not possible, but there are many who think that later knowledge will show that all mass is electrical in its origin. At that statement we must leave it. The great gap in our present knowledge is the fact that we are unacquainted with the nature of positive electricity. In spite of many workers the riddle is still unsolved, and the answer obviously has an important bearing upon the true nature and form of the atom. If the atom is electrically neutral, which it is, then an element of positive electricity must be present in it. If we suppose that the positive electricity is distributed uniformly over a sphere the size of the atom, certain physical experiments suggest that the number of electrons in an atom must be just three times its atomic weight, that is, a hydrogen atom would contain three electrons. On the other hand, if we suppose the positive electricity to exist as a kind of nucleus at the centre of the atom, and that the electrons, composed of negative electricity, revolve round it, then the number of electrons in a hydrogen atom would be one, and the number in any other atom be exactly equal to the atomic weight. This conception is as yet unproved, but the giving of unit atomic weight to hydrogen would be of the highest physical significance as it would make the hydrogen atom to be the lightest which could possibly exist. At present, it is impossible to assign any appreciable part of the atomic mass to the electrons contained in it; the very most that can be affirmed is that the number of electrons in an atom is but a very small multiple of its atomic weight. Of course, if the whole mass is electrical and that it resides only in the positive portion of the atom, then the mass of a negative electron is about one eighteen-hundredth part of the mass of a hydrogen atom, and, since also for a given charge of electricity the mass of an electron is inversely proportional to the radius of the sphere upon which it is concentrated, it follows that if the positive charge on a

hydrogen atom be concentrated upon a sphere only one eighteen-hundredth of the size of the negative electron, the mass of that positive charge would be eighteen hundred times as great or just equal to that of the hydrogen atom. These are pure speculations and quite unsupported by evidence, but they indicate the trend of modern thought and the paths along which it is hoped the escape from the wood will be reached.

Though the electrons form but a minute part of the mass and a still less part by volume of the whole atom, they play a big part in determining the properties of the atom. This part is due to the great motility of the electrons. Our great difficulty is, suppose we take the electrons away from the atom, what is there left? As the atom is neutral and the electrons are electrically negative, it follows that the atomic residue must be positive electricity; beyond that we know nothing. To some, the existence of a positive electron presents the true solution of the problem, and if that be proved many of the phenomena associated with the atom will have to be reconsidered and referred to that as yet undetected positive electron rather than to the negative electron. Working on the facts which are known, the most probable hypothesis is that which regards the positive part of the atom as forming either a) uniform shell co-terminous with the atom, or a central nucleus. By the first hypothesis, the electrons would move about within the positive shell and be attracted with a force varying with their distance from the shell. By the second hypothesis, the electrons would revolve round the nucleus-like positive charge with a force varying inversely as the square of the distance. Of the two conceptions, the consensus of opinion is in favour of the latter; but it is not easy, from the laws governing such a system, to determine the way in which the electrons would be arranged, or deduce the properties to be expected from such an atom. A great deal of theoretical work has been done by J. J. Thomson as to the grouping of electrons in a sphere of positive electricity just sufficient to neutralize their charges at points outside the sphere. From this work it appears that a single electron at rest will place itself at the centre of the sphere, and if in motion will revolve round that central point with a radius depending on its velocity. If there be two electrons, they will place themselves at the opposite ends of the diameter of a circle whose radius is equal to half the radius of the positive sphere; and in the case of three electrons, they would arrange themselves at points corresponding to the angles of an equilateral triangle. Assuming four electrons at the corners of a square, this

arrangement is not a stable grouping if the electrons be at rest, but is possible if they revolve round the centre at a velocity in excess of a certain critical value. If the velocity falls below this value, the arrangement collapses into a tetrahedron with the evolution of some energy. If there be six electrons, they would arrange themselves at the corners of a regular octahedron, but eight electrons at the corners of a cube is not a stable grouping as it will collapse into two tetrahedra, one inside the other. The eight electrons at the corners of a cube is a stable arrangement only provided a ninth electron is located within the system at the centre. The whole question of arranging a number of electrons in a space of three dimensions is extremely difficult, if not impossible. So much so, that we may make the generalization that, in electron grouping, the presence of a given number of electrons near the surface or outside of an atom demands that there shall be a certain definite number of electrons within, in order that the system may remain stable. Otherwise, the arrangement must collapse into some simpler system.

It is possible that much of the difficulty in respect of this matter arises from attempts to solve the problem and the movements of electrons in a space of three dimensions. Certain experiments of Mayer suggest a consideration of the problem from the point of view of the electrons confined to a single plane. He magnetized a number of needles, and by inserting their positive poles in corks enabled them to float in water with their negative poles at equal depths below the fluid. Needles so floated are analogous to electrons, and it is obvious that their negative poles will repel each other according to an inverse square law, just as the electrons do. By placing a strong electro-magnet with its positive pole upwards below the basin in which the magnetized needles are floating, it is found that the attraction of this positive pole for the negative poles of the needles, for the horizontal plane in which alone the needles can move, is practically proportional to their distance from a point immediately above the pole of the magnet. The electro-magnet represents in this case the hypothetical action of the positive element or sphere of the electron. If one tries this experiment, one finds that five is the greatest number of magnetized needles which one can have in an empty ring. If we put a sixth needle into the ring, the ring breaks up with five on the outside and one in the centre. Further, the more magnetized needles we place in the outer ring the more must be placed centrally. Actual trial shows that an outer ring of 12 requires 8 inside, and an outer



ring of 30 needs no less than 101 inside for stability. It is obvious that the outer and inner magnetized needles are subject to the same laws, and the whole system splits up into a series of concentric rings with a definite number of elements in each.

The mathematics of the question have been worked out by J. J. Thomson and his pupils to a point in which the model atom contains 52 electrons. Their results are highly interesting, but purely theoretical, and probably in no way represent actual atoms of any real substance. As examples of this work one may instance a hypothetical two-ring arrangement of 8, 9, or one of 10 electrons in the outer ring and 3 in the inner ring. Again, in a three-ringed arrangement, one may have 11 in the outer, 5, 6, or 7 in the middle ring, and 1 in the centre. So again, with 12 in the outer ring there may be 7 or 8 in the middle ring, and either 1, 2, or 3 in the centre. In the case of quadruple ring arrangements, it is found that theoretical stability results from such combinations as 15, 11, 5, 1, or 16, 11, 7, 1, or 16, 13, 8, 3, and 17, 15, 11, 5, in which the first number represents the outer ring and the last the inner. Taking a more complex arrangement of five rings, we get stability with rings of 17, 15, 11, 5, 1, or 18, 15, 11, 5, 1, or 18, 15, 11, 7, 1. These examples are merely a few of the combinations which have been determined.

The interest of this essentially theoretical grouping lies in the fact that, as the number of electrons in the atom is proportional to the atomic weight, this theoretical series represents a series of model elements and, curiously enough, a definite similarity shows itself to Mendeleef's periodic classification of the elements in the series. Thus, if we start with an original grouping of 5 electrons in an outer ring and 1 in the centre, this arrangement disappears, but recurs again with the addition of an extra outer ring of 11 as in 11, 5, 1. It disappears again only to recur if we add a new outer ring of 15, as 15, 11, 5, 1; then disappears again to recur on the addition of a further outer ring of 17, or 17, 15, 11, 5, 1. If we associate any physical or chemical property of the atom to this or any other arrangement of the electrons, it is obvious that we have a definite parallelism between the electron grouping and the periodic table of Mendeleef. Academically, this is most interesting, but, from the practical point of view, it warrants no dogmatic statements; in fact, so little precise is the knowledge on this point that, for general purposes, the general law enunciated above when referring to a three-dimensional system is sufficient. It is legitimate to suppose that the inquiry is on right lines and that, later on,

all phenomena associated with the atom will be capable of interpretation in terms of some system of electron grouping. Even now one can readily conceive the molecular forces of adhesion, tenacity, elasticity, surface and vapour tension as being dependent on the resultant force between the different parts of the two electrical systems which make up the atom, and each of which is neutral as a whole. The magnitude of these forces will clearly depend on the number and grouping of the electrons in the atom. One dare not say more.

Even though one cannot formulate a complete theory of cohesion, it is obvious that the forces binding different atoms together in a molecule are electrical in their origin. Take common salt, as an example; we have there the mutual attraction of a positively charged sodium atom for a negatively charged chlorine atom. So, again, valency is explicable from the conception that the ions of certain elements carry electrical charges in excess of others. Developing the idea further, we can say that when a neutral atom tends to part with its electrons there is positive valency, and when a neutral atom tends to absorb electrons from without there is negative valency. If electrically positive and negative atoms are present together there will be a mutual interchange of one or more electrons, and the passage of an electron from one atom to the other will charge positively the former and negatively the latter; moreover, the attraction of the positive atom for its lost electron will explain and represent the force of chemical combination between the two atoms. As to how many electrons can be so lost or gained will depend upon the number and arrangement of the electrons and the forces with which they are held in the atom. It is not difficult to conceive that some electrons are held firmly and some comparatively feebly, within the atom. From some work by Abegg it seems likely that the greatest number of electrons which an atom can lose or gain does not exceed eight, or the greatest charge found to be carried by a positive particle. Abegg suggests that every element has two valencies, a normal and a special valency, the normal being the stronger; further, the sum of these two valencies for any element does not exceed eight. From this conception we pass readily to the idea of the electrons being, so to say, either fixed or free, and that it is the free electrons that determine the valency of the atom.

The question arises, how are these more or less free, or detachable, or valency electrons arranged in the atom? We may assume they form the innermost ring of the atomic system, and that their

number be anything from 0 to 8. If we imagine an atom with an inner ring of five electrons, then either of two events may occur. The atom will either part with its five valency electrons, becoming thereby positively charged, and so have a positive valency of five; or the atom will attract three electrons from without to make up its complement to eight, thereby becoming negatively charged, and have a negative valency of three. Which of the two events will occur depends on the nature of the contiguous atoms; that is, whether surrounded by atoms ready to attract free electrons, or by atoms tending to part with electrons. Thomson and his pupils have applied these ideas to the periodic table of Mendeleef and, theoretically, it is conceivable that, giving the elements of the first group in their neutral state one valency or free electron, the number of valency electrons in the atom increase uniformly along the series, until the halogens or seventh group, which have a total number of seven. The fourth or carbon group has four valency electrons. Since we may expect that the number of electrons in the inner ring of the atom would incline to that stable number, either 0 or 8, to which it was originally nearest, it follows that the elements having fewer than four free electrons would be electro-positive, and those having more than four would tend to make their number up to eight and be electro-negative. On this principle, the elements of the first three groups will normally have positive valencies, the fourth group be indifferently positive or negative, and the fifth to seventh groups have negative valencies. It is a suggestive concept but at present entirely theoretical.

The hypothesis, outlined above, explains further the curious connexion between the valency sign and electrical conductivity. Excepting hydrogen, all the electro-positive elements in the solid state are conductors of electricity. We have assumed that the electro-positive elements are those which give up electrons readily and, as these electrons will move freely in an electric field, the electrical conductivity of those elements is explicable by their characteristic of having readily detachable electrons. On the other hand, since the electro-negative elements incline to absorb electrons and are deficient of electrons in the free state, the electric current finds no carriers and is unable to pass. Another interesting fact which supports the hypothesis is, that inert gases like those of the helium group have no valency, presumably no free electrons, and an extraordinarily small power for light dispersion. The halogens, on the other hand, have presumably the maximum number of free or valency electrons and a high faculty of dispersing

light. Optical experiments have shown that light dispersion is due to free electrons present. Theoretical though it be, the conception of an electron theory of valency goes far to explain known facts and warrants the opinion that it is conceived on right lines; through it or some modification of it, we may look with some confidence to the solution of phenomena which at present are distinctly puzzling.

One has stated above that light dispersion is due to the presence of free electrons; some aspects of recent work in this direction are worth consideration. We have used the analogy of thinking of an electric field in terms of tubes of force, and we have conceived the idea of these tubes of force radiating in all directions around the path of the electrons. Further, it is known that when a moving electric charge is retarded or accelerated in any way, a wave of electro-magnetic disturbance radiates out through the surrounding space. Now, a tube of force is in some respects very like a hair, bristle, or rope stretched out from the electrons and their path. If we conceive a particle or electron to oscillate about a mean position, a series of undulations will be set up in the tubes of force connected to it, very much as we see when one end of a long rope is shaken to and fro. Precisely in this manner a series of electro-magnetic waves move out from a vibrating electron, and their frequency will be equal to the number of vibrations made by the particle or electron per second. If these undulations have a wave length between 0.0004 and 0.0008 mm. per second they produce on us the impression of light. Recent work goes to show that by such vibrations of and from the electrons is the only way in which light can be produced. Put into plain language, unless matter be charged with electricity it is incapable of setting up any kind of disturbance in the æther.

Arising out of these considerations a very interesting fact has been observed by Zeeman. He found that if a source of light emitting a line spectrum were placed between the poles of a powerful electro-magnet and examined with an interference spectrometer of high resolving power, the line was split up into three components when viewed at right angles to the magnetic field and into two when looked at along the lines of force in the magnetic field. To understand the reason of this we must consider briefly the effect of applying a magnetic field to the charged particles oscillating about their mean position and emitting vibrations. The vibrations will have paths both parallel to and at right angles to the lines of force in the magnetic field. Those performed along the lines of the field

will be unaffected by the field, since the latter produces no mechanical effect on a particle moving in its own direction, but it will be different with those vibrations occurring at right angles to that direction. As vibrating particles are performing two circular motions in opposite directions, it follows that for charged particles moving at right angles to the magnetic field, any mechanical force acting on them will act in the direction of the line joining the particle at any moment to the centre of its own circle. With a number of particles subjected to this action, the effect of the magnetic force will be to drag some towards the centre of their orbit and thereby increase the rapidity of their vibrations, while on others the effect will be to expand the orbit and render the vibrations slower. Thus, instead of all the particles describing their orbits in exactly the same time and thus producing light of one frequency only, one group will have been accelerated and the other retarded by the magnetic field, so that instead of a single line the spectroscopist reveals two or more. When, as in Zeeman's observations, the light is viewed along the lines of force, the vibrations taking place in the line of sight produce no effect on the eye; but only the two new ones, one on each side of the position of the original line as located before the light was placed within the magnetic field, are visible. If, however, inspection be across or at right angles to the field, the vibrations occurring along the lines of the field will be visible through the spectroscopist, and since their rapidity is not affected by the magnetic field, they give a line in the position of the original and undecomposed line. Since the circular paths of all the vibrations are now being viewed from end on, all three lines are observable.

Many spectra show the Zeeman phenomenon; some simply and others in a complicated form. The lines in the spectrum of an element, therefore, represent the various modes of vibration of the electrons associated with it, and it is not unreasonable to hope that, as a fuller knowledge of the periods of those vibrations is attained, by this method it will be possible to reconstruct the atom with accuracy. Theoretically this should be so, but one understands that the mathematical difficulties are stupendous. Anyone familiar with the spectra of the elements knows that at first sight they seem to be a confused jumble. In the light of this new knowledge, it is recognized that in many cases the lines of the spectrum can be grouped into definite series, in accord with a mathematical equation. Thus, it is now found that all the lines of a single series are exactly similar; if one of a series be sharp and well defined, all of that

series are sharp, and if one of the series be indistinct then all are diffused. In other words, the two types of lines are never associated in the same group, and any physical change brought about in one line of a series is reproduced simultaneously in all the others. The conclusion to be drawn is that they are all different modes of vibration of the same system.

Another interesting fact is, not only do the spectra of single elements show these close relationships, but the spectra of different elements, belonging to the same periodic group, display the same. From this one draws the inference that the respective vibrating systems are identical in form, but differ from each other only in being placed in slightly different surroundings. The question arises, how are the facts explicable from the new ideas as to the nature of the atom? We have arrived at the conclusion, in an earlier part of this article, that the number of electrons in an atom is probably small; in fact, so small that the hydrogen atom probably has but one electron, or certainly not more than three. A single electron has only three modes of vibration and those would all have the same period; consequently, in the simplest form of atom, these vibrations would coalesce into a single spectra line. In the more complex atoms, we can imagine the series of spectra as being given out by the inner rings of electrons, which inner rings would be identical for elements belonging to the same periodic group. In closely associated elements, but of greater atomic weight, there would be extra or outer rings of electrons, and these would affect any forces acting on the rings sufficiently to alter the actual frequencies of the vibrations, without disturbing the relation between them. This is tantamount to saying that the outer rings of electrons perturb the vibrations of the inner ring without destroying their character. A difficulty arises how to apply such a theoretical conception to the practical and well-known fact that the spectra of most elements are extremely complex. J. J. Thomson gets over the difficulty by suggesting that the lines in the spectra of the elements are not omitted by the atoms of the element but by systems of electronic vibrations which exist only when the element is put into a luminous condition. In support of this idea, he advances the phenomena of selective absorption of light, as illustrated by the familiar experiment of the reversal of the sodium lines. If white light, transmitted through sodium vapour, be examined with a spectroscope, there can be seen two sharp dark lines corresponding in position with the two bright lines, which would be visible were the sodium made incandescent.



The explanation seems to be that the sodium atom contains systems of electrons which, when suitably excited, give a light of the vibration frequency corresponding to the two sodium lines. One may say that the sodium atom is tuned to that frequency and vibrates if oscillations of its own period fall upon it. In so responding it abstracts the energy of the radiation in tune with itself, with the result that the latter is absorbed, leaving only light of a vibration frequency remote from its own to pass on unaffected. It comes, therefore, to this, that the light is deprived of all which has a frequency corresponding to those of the electronic system within the atom. On the other hand, the electronic systems, whose normal frequency periods fall within the range of the visible spectrum, produce a dark line when white light is passed through them.

That the above theory and explanation is fairly near the truth is supported by the fact that such absorption bands are not seen when white light is viewed through a mass of hydrogen. Considering the very simple nature of the hydrogen atom, this is what we might expect and, further, forces the conclusion that the vibrating systems which give the hydrogen spectrum are not in the gas in its normal condition, but that the lines are formed by systems of electrons formed when the gas is put into a luminous state. The reader may ask, how can an atom be made to emit spectrum-giving vibrations? Practically, nothing short of driving an electron into or out of the atom will succeed in vibrating the systems of electrons which emit light. Expressed chemically, this means the establishment of an area of recombination or ionization. Imagine an atom within this area and losing an electron and, thereby, becoming charged positively. The loss of the electron will upset the dynamics within the atom, and the remaining electrons will oscillate to attain equilibrium, and their vibrations, if of suitable frequency, will produce a set of lines characteristic of its spectrum. Meanwhile, the positively charged atom is besieged by many negative electrons, whom it attracts. Normally, one would enter the atom to replace the escaped electron, but if the mutual kinetic energy is sufficient, then the electron will revolve round the tempting or attracting atom; and, the revolutions of the two being isochronic, the revolving electron will produce a single line in the spectrum, having a frequency corresponding to the time the electron takes to complete the circle. All this while, the free electron would be losing energy, and a time would come when it could no longer continue rotating, but fall into the atom. So long as the

exciting conditions were maintained, fresh systems would be set up and the phenomenon of the line continue. Now, what is happening when the fresh electron enters the atom? The first effect will be to make the atom neutrally charged and, secondary to that, the vibrations of its electrons will be of a different frequency to what they were when the electron was expelled. From some recent experimental work, there is reason to think that the normal bands of the spectrum of an element are the result of vibrations corresponding to the return or replacement of a lost electron, while the vibrations set up on its loss and those due to special electronic vibration systems produce the different series of line so characteristic of some spectra.

In closing this article, one wonders if one has succeeded in making it intelligible and interesting to the ordinary reader, that is, to the man unfamiliar with the modes of thought and expression of the physicist. The difficulties in the way of securing that object will be obvious to the least sympathetic reader, and it is hoped that due allowance will be made for any defects of the kind. It has been impossible to avoid using certain mathematical expressions, but the few employed should cause no trouble. A man, to whom I have shown this article, tells me that I ought to explain the meaning of the negative power. At the risk of offending the informed, I take his advice and say that  $10^{-7}$  is merely an abbreviation for 0.0000001, and a device to avoid writing a long row of decimals. One has tried to explain the modern conception of the electron and the manner in which the atom is built up of these conceptions of ultimate matter. Little has been said of the molecule, since it presents no difficulties if the idea of the atom, of which it is but a grouping, has been grasped. On the other hand, one has not hesitated to enlarge upon some speculative deductions current among the advanced school of physicists; it is hoped that some of those theoretical sidelights may not only be interesting, but also stimulative of ideas to others. Finally, one claims no personal originality of thought; one has but tried to put together, as a sequential whole, the odds and ends of knowledge which leisure hours have enabled one to pick up.

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## FACTORS WHICH MAY INFLUENCE THE PRODUCTION OF "HEAT-STROKE" AMONG TROOPS ON THE MARCH OR ON SERVICE.

BY MAJOR C. F. WANHILL.

*Royal Army Medical Corps.*

DURING the course of a series of experiments, conducted in India under the orders of the Director of Medical Services, to determine the relative value of red linings for helmets in India, a number of interesting observations were made which, if correct, have a great bearing on the production of "heat-stroke," or rather of exceedingly high temperatures in helmets when on the men's heads. As the order for the performance of these experiments did not arrive in Mhow till the rains had set in, the experiments were necessarily postponed till the rains had ceased, and the temperature of the station does not rise to a great height after the rains. The experiments, therefore, were conducted rather hurriedly and with comparatively low temperatures, and the results, on this account, are not considered as absolutely conclusive. The conditions, however, permitted the use of clinical thermometers, the only small self-registering ones available, which would not have been possible in the real hot weather. It is hoped, if small self-registering thermometers, with a higher range of temperatures, can be obtained, to repeat the experiment in the coming hot weather.

From the point of view of the red linings it may at once be stated that no difference was observed between these and the ordinary white linings.

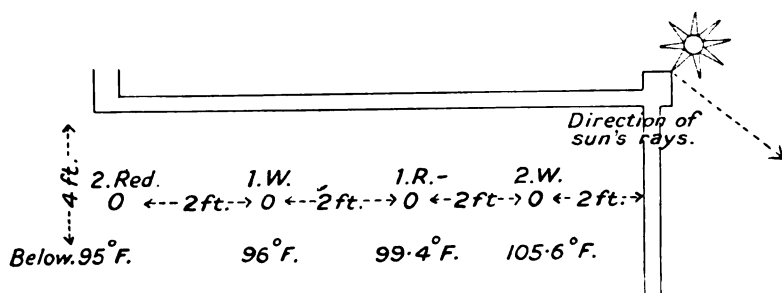
Four helmets were taken, two with red and two with ordinary linings; in these clinical thermometers, fixed at both ends in corks, were slung with string in such a way that the thermometers could not touch any part of the helmet, or the head of the person wearing it. Four "heads and posts" were borrowed and the helmets fitted closely to these, the same helmet being placed each day on the same head.

The "heads and posts" were first placed in the porch of the hospital and left all day. The result was as follows:—

Red lined		White lined		Dry bulb		Wet bulb	
(1) 104·8° F.	..	(1) 104·6° F.		90° F.	..	72° F.	
(2) 109·6° F.	..	(2) 107·8° F.					

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This result was obtained several times, and was not understood till a definite location of the heads and posts was made, when the following results were obtained :—



It was then obvious that the cause of the high temperatures in some of the helmets was the reflection of heat from the parapet. The reflection was from below, since the height of the parapet was about three feet, and that of the heads from the ground about seven feet. Hence the first point was made, i.e., that reflected heat from below, probably entering the ventilation holes, could raise the internal temperature considerably.

In order to determine the effect of lateral reflection, the helmets on the posts were placed in the sun, near a wall, with the following results :—

	Red lined		White lined		Dry bulb		Wet bulb
(a) (1)	108.2° F.	..	(1) 104.4° F.	..	91° F.	..	68° F.
(2)	107.4° F.	..	(2) 103.6° F.				
(b) (1)	110.4° F.	..	(1) 109.9° F.	..	86° F.	..	63° F.
(2)	112.2° F.	..	(2) 111.4° F.				

It was evident, therefore, that the temperature inside the helmets was raised considerably by reflection from a wall.

Experiments were then made to determine the effect of wind on the temperatures recorded. The conditions were as follows :—

(a) No wind when the helmets were put out. The readings were :—

	Red lined		White lined		Dry bulb		Wet bulb
(1)	108.2° F.	..	(1) 104.3° F.	..	91° F.	..	68° F.
(2)	107.2° F.	..	(2) 103.6° F.				

(b) Slight wind. The readings were :—

	Red lined		White lined		Dry bulb		Wet bulb
(1)	101.2° F.	..	(1) 101° F.	..	86° F.	..	70° F.
(2)	97.8° F.	..	(2) 100.6° F.				

(c) Strong north wind. The readings were :—

	Red lined		White lined		Dry bulb		Wet bulb
(1)	97.2° F.	..	(1) 95° F.	..	88° F.	..	69° F.
(2)	98° F.	..	(2) 97.8° F.				

It was therefore obvious that wind had a considerable influence on the temperatures recorded. This was proved in another way. The helmets were placed in the sun so that No. 1 Red was in the wind, No. 2 Red slightly sheltered, Nos. 1 and 2 White completely sheltered. The results were as follows :—

Red lined	Red lined	White lined	White lined	Dry bulb	Wet bulb
(1) 100·6° F.	(2) 103·6° F.	(1) 107° F.	(2) 107·3° F.	86° F.	63° F.

It must be understood that these results are taken from amongst those of a number of other experiments, the bulk being left out to save space, and as giving the whole series would simply involve useless repetition of similar figures.

In order to test the results when the helmets were worn by men, four men were selected and the thermometers fitted in their helmets. The ventilation holes round the head band in one man's helmet were crushed in purposely. The men sat in the sun, near a wall, for one hour, between 12 noon and 1 p.m. The readings were :—

Red lined		White lined		Dry bulb	Wet bulb
(1) 110° F.	..	(1) 109·4° F.	..	87° F.	68° F.
(2) 110° F.	..	(2) 110° F.			

The men then walked quietly about in the open for the same time, there being a strong north wind. The readings were :—

Red lined		White lined		Dry bulb	Wet bulb
(1) 100° F.	..	(1) 100° F.	..	86° F.	69° F.
(2) 102·4° F.	..	(2) 105° F.			

The men walked about as before, but there was little wind. The readings were :—

Red lined		White lined		Dry bulb	Wet bulb
(1) 104·2° F.	..	(1) 105° F.	..	87° F.	68° F.
(2) 102·2° F.	..	(2) 102° F.			

No. 2, white lined, was the helmet with the crushed ventilating apertures.

The results, therefore, bore out those obtained with the heads and posts, and also showed that the temperature in a helmet without ventilation rose to a considerable height.

Further experiments were made (to see if light penetrated) with closed boxes of straw-board, lined with red and white cloth. In no case was photographic paper affected.

#### CONCLUSIONS.

(1) Considerable heat can be reflected from the ground or from objects below the helmet.

(2) Heat is reflected from walls, etc., and also affects the temperature.

(3) Absence of wind raises the temperature in helmets.

(4) If the ventilation of the helmet is defective a similar result ensues and the temperature rises to a considerable height.

(5) The colour of the lining has no effect on the heat penetration, and light does not penetrate the helmet walls.

It seems obvious from the above results that, given a well-ventilated helmet and wind, no excessive temperature should result in the helmet, but that, in the absence of either of these factors, a high temperature may result. With men marching close together heat would probably be reflected from their clothing and affect the temperatures, while when a man is lying down to fire the heat of the ground would also send up the temperature in the helmet. It is only fair to say, however, that the men did not complain of the effects of the high temperatures recorded, but this was in Mhow. What height the temperature might reach in, say, Hyderabad, Sind, or similar stations, cannot be stated, and ill-effects might quite conceivably arise from this cause. It seems, therefore, desirable that attention should be paid rather to the means of effective ventilation than to the colour of linings of helmets.

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## INFECTIVE GASTRO-ENTERITIS OR SUMMER DIARRHŒA: ITS NOMENCLATURE AND DIAGNOSIS.

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DIARRHŒA, whatever the cause, is brought about by irritation of the mucous membrane of the intestine. But we must not lose sight of the law that the normal action of the bowel depends upon a reflex arc by way of the sympathetic and vagus nerves, the vagus nerve in the intestine being the afferent nerve. The action of this reflex arc depends upon two factors: (1) The excitability or power to respond to stimulus, and (2) the amount of stimulus or irritation. Therefore the normal balance may be upset, firstly by increased excitability of this reflex arc, the normal contents of the bowel setting up irritation, or, secondly, by increased irritation due to abnormal or noxious matter in the bowel. Thus we see that in the first case the excitability is increased, but the amount of irritation remains the same, providing the normal stimulus to which the reflex arc responds more vigorously; and in the second case the excitability remains the same, but the amount of irritation is increased. The result in both cases is the same—unduly vigorous action.

The reflex excitability may be brought about in many ways, as, for instance, by emotional causes. Many a student awaiting a viva voce examination has suffered from nervous diarrhœa, and many shy persons suffer thus before going into society. A child during the process of dentition is very liable to suffer from diarrhœa; this may be due to reflex excitability, or may be due to lowered resistance on the part of the child and increased activity on the part of the bacterial flora of the intestine; or possibly, again, to the simultaneous operation of both causes, if the child be below par. Increased irritation may be brought about by insufficient digestion, and undigested particles setting up intestinal irritation; or to ingestion of indigestible material, such as unripe fruit, nuts, etc., or to the ingestion of specific organisms, such as those of cholera, typhoid, and dysentery. The above causes will account for the comparatively few cases that occur during the winter months; but the causation of the enormous number of cases that occur in hot months, particularly in August and September, needs a more thorough investigation.

Many writers speak of "summer diarrhœa" as a specific disease distinguished from simple diarrhœa by its greater severity; this is incorrect if one is to draw any distinction at all between various kinds of diarrhœa. The only rational classification that can be made must be based on the cause or causes, not on the symptoms. One sees in the detailed description of cases that the severity of symptoms is no guide to the prognosis, and therefore unsound as a basis of classification. "Summer diarrhœa," if it be used as a specific name, should include all cases of the mildest type as well as the severe; those in which motions occur only four or five times in twenty-four hours with no sickness, and those with vomiting four or five times a day with no diarrhœa, as well as the most acute cases in which motions with blood and mucus occur every few minutes, and everything taken by the mouth is vomited.

In several instances of large families that were afflicted with the disease, the mother suffered from colicky pains with no diarrhœa or sickness; three or four children were seriously ill with the bowels acting every ten minutes, passing blood and mucus, and vomiting all food, while another child perhaps had only the slightest touch of diarrhœa. To take examples of these:—

(1) Child, aged 2, brought up for treatment on August 23, having been seized with diarrhœa and sickness on the evening before. On careful questioning one found that the sister, aged 5, had an attack on August 19, cured by "diarrhœa mixture" from the chemist; on the 16th, the father had severe diarrhœa; the mother on the 15th suffered from colicky pains but had no diarrhœa or sickness. In this family are we to say that the child aged 2 had infective enteritis, the father and sister simple diarrhœa, and the mother colic? It is far more likely the cause and the disease were the same in kind and the difference only in degree.

(2) Child, aged 1 year and 3 months, brought for treatment; vomiting everything, bowels open every few minutes, fæces streaked with blood, the action accompanied by severe abdominal pain. The mother had diarrhœa but no sickness; the sister, aged 9½, had severe pains in the stomach, but no diarrhœa or sickness.

(3) Child, aged 12 months. Diarrhœa and vomiting began on August 12. Vomiting ceased in a few days, but the diarrhœa continued. The brother, aged 3, returned from a holiday on the 20th, and was attacked by diarrhœa four hours after arrival, but had no sickness.

(4) Child, aged 3 years and 3 months, seen on August 28, having first been taken ill on the 25th; vomiting everything,

bowels open every half-hour, the action accompanied by considerable collapse. The mother had "a touch of diarrhœa" from the 23rd onwards. The other child, aged 4 years and 3 months, had vomiting but no diarrhœa; three other children had slight diarrhœa and vomiting.

The above examples show every gradation of colic, sickness, and diarrhœa, separately and combined; but in each example there is at least one member of the family with a severe diarrhœa that can only be diagnosed as "summer diarrhœa," or "infective gastro-enteritis." This suggests that all the mild cases associated at the same time and in the same household, or that have had contact with a case of severe infective gastro-enteritis, are probably to be included in the same category with the severe cases. In some the affection may be chiefly or entirely gastric, in others entirely intestinal, therefore the name "summer diarrhœa" is not quite accurate. Again, diarrhœa, if inflammatory, means enteritis, and simple diarrhœa, though it may be enteritis does not seem to be infective except in hot weather; and cases of this mild character when they occur in hot weather are clearly shown by examples to be infective. Hence the best name for these infective cases occurring epidemically in hot weather is "infective gastro-enteritis." "Summer cholera" is obviously a bad name, as the disease may be confounded with cholera, properly so-called, which is caused by the cholera vibrio.

#### RELATION OF THE DISEASE TO METEOROLOGICAL CONDITIONS.

In Tables I, II, and III are shown meteorological statistics of temperature, rainfall, etc., obtained from the Observatory, Greenwich, and embodied in the quarterly returns issued by the Registrar-General for the summer quarters from 1902 to 1911 inclusive; also the death-rates from diarrhœa in London and in Woolwich during those periods. In the column entitled "cases notified" the numbers refer to voluntary notification of zymotic enteritis in the borough of Woolwich from 1905 to 1911 inclusive; but as only the first case in each family is notifiable the figures refer to the number of families affected and not to the number of cases. Still further, they refer only to severe cases, and do not include mild cases, which are very rarely notified by practitioners. These numbers are, however, defective in so far as some practitioners did not notify any of the cases occurring in their practices, as was shown by the registration of deaths from diarrhœa and zymotic enteritis in cases which had not been notified. For the

figures of "cases notified" I am indebted to Dr. Sidney Davies, Medical Officer of Health for the Borough of Woolwich.

Taking first the figures in the table for 1911, the cases notified at Woolwich in that year were three or four times as many as in any other year from 1905 to 1910. In 1904 the disease was not notifiable, so that the number of cases in that year is unknown. In 1911 the death-rate in London was higher than in any other year from 1902 to 1911; but in Woolwich the death-rate in 1904 was the highest. In 1911 the figures for temperature were all higher than in any other of the years considered in respect of the mean temperature of the air, the mean temperature of the three-foot ground thermometer, the maximum weekly average, and the maximum shade temperature; the total rainfall and the number of days on which rain fell being less in 1911 than in any other year, 1902 to 1911. Thus we see a great preponderance in the occurrence of the disease coincident with a hot and dry summer quarter. The next most severe years were 1904 and 1906. In London the death-rate was 4.02 in 1904, and 3.84 in 1906. In Woolwich the rate was 4.52 in 1904 and 2.54 in 1906. But if we take the meteorological records of Greenwich for 1904 and 1906 we see that the mean temperature of the air and the mean temperature of the three-foot ground thermometer during the whole summer quarter were higher in 1904 than in 1906. We see also that the mean temperature three feet below ground in 1906 was greater than in 1904. The total rainfall in 1906 was 3.78 inches against 5.8 inches in 1904, and the number of days on which rain fell in 1906 only twenty-six as against thirty-four in 1904. The highest shade temperature in 1906 was 94.3° F. and in 1904, 91° F., but the maximum weekly average was higher in 1904 than in 1906, i.e., 64.62° F. against 64° F. Thus we see that 1906, taken all round, was a hotter and drier summer than 1904, with a higher maximum shade temperature; yet in 1904 the death-rate from diarrhœa in Woolwich, only two miles from the meteorological station at which the temperature observations were made, was nearly double that in 1906. The only temperature record in 1904 that was higher than in 1906 was the maximum weekly average. This was brought about as shown by the following facts:—

July, 1904, was remarkable for drought and high minimum thermometer readings; also the maximum shade temperature recorded was above 90° F. on several days in July, though not going above 91° F. throughout the summer. August and September of 1904 were below the normal temperature through-

out. In 1906 the temperature was below normal in July and August until August 31; then the thermometer suddenly rose to 94·3° F., and a high average was maintained till the end of the quarter. This is shown by comparing the average three-foot ground thermometer and the mean of maxima:—

				Average three-foot ground thermometer			Mean of maxima
1904	July	..	..	62·0° F.	..	..	77·3° F.
	August	..	..	63·2°	..	..	73·0°
	September	..	..	59·0°	..	..	64·7°
1906	July	..	..	61·0°	..	..	75·4°
	August	..	..	63·4°	..	..	77·0°
	September	..	..	61·6°	..	..	69·8°

Thus it is seen that when once the temperature rose in July and was maintained at a high level, giving the high maximum weekly average of 64·6° F., the disease was started and maintained in spite of the cool weather during August and September. But in 1906 the excessive temperature occurred late in the summer; the thermometer rose to a higher level than in 1904, but only for a day, and then remained at a high level to the end of the quarter; but the maximum weekly average was not brought above that of 1904, and the death-rate remained comparatively low.

Possibly the rainfall may have affected the incidence of the disease in these two years, for on studying the reports on the rainfall for 1904 and 1906, one observes that the total rainfall in August and September in 1906 was greater than in 1904; moreover, the heaviest fall in each of those two months was greater than the corresponding ones in 1904; the heaviest rainfall in 1904 occurred in July before the maximum temperature was reached.

				Total rainfall			Heaviest fall
1904	July	..	..	2·23 in.	..	..	1·55 in.
	August	..	..	1·24 „	..	..	0·52 „
	September	..	..	1·34 „	..	..	0·36 „
1906	July	..	..	0·41 „	..	..	0·17 „
	August	..	..	1·39 „	..	..	0·79 „
	September	..	..	1·97 „	..	..	0·57 „

The heavy rains occurring late in the summer of 1906 would materially affect the existence of house-flies, which, as will be shown later, probably play a great part in the propagation of the disease.

Again, looking at Table I it is seen that the death-rate in London varies almost directly as the maximum weekly average temperature. The highest death-rate in London was 4·28 in 1911

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with the highest maximum weekly average temperature of 72·5° F. The next was in 1904 with a death-rate of 4·02 and a maximum weekly average of 64·5° F. The next was in 1906 with a death-rate of 3·84 and a maximum weekly average of 64° F. The lowest death-rate during the ten years was in 1907, when the lowest maximum average temperature was also recorded, i.e., death-rate 0·73 and maximum weekly average temperature 60° F. That the death-rates for Woolwich do not show this exact relationship is due to the fact that owing to the precautions taken following on voluntary notification since 1905 the deaths have been very much reduced in number. This reduction in the death-rate, compared with case incidence in Woolwich since 1905 is discussed by Dr. Sidney Davies in his report published in the borough in 1910. He attributes this reduction to the preventive work and supervision of infant feeding carried out by health visitors in the families in which a case had been notified.

TABLE I.

	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911
Cases notified, Woolwich	—	—	—	212	366	93	173	149	102	849
Number of deaths, Woolwich	40	37	139	56	93	22	38	10	9	109
Death-rate, Woolwich	0·97	0·96	4·52	1·72	2·54	0·34	0·87	0·25	0·12	3·6
Death-rate, London	1·78	1·84	4·02	2·87	3·84	0·73	1·9	1·21	0·84	4·28
Mean temperature of air	59·1°	59·0°	60·0°	60·6°	62·4°	58·8°	59·3°	58·7°	57·2°	65·6°
Mean temperature, three-foot ground thermometer	59·6°	60·1°	61·4°	61·6°	62·0°	59·15°	60·3°	59·2°	59·3°	64·0°
Maximum weekly average	61·0°	61·6°	64·6°	64·1°	64·0°	60·0°	62·6°	62·7°	61·2°	72·5°
Maximum shade temperature	85·8°	87·5°	91·0°	—	94·3°	83·0°	84·0°	86·0°	77·0°	100·0°
Rainfall in inches	5·91	12·3	5·8	5·65	3·78	3·77	8·15	7·43	6·08	3·0
Number of days on which rain fell	—	46	34	33	26	32	38	46	37	22

From the above statistics it may be seen that the onset of an epidemic and the total incidence of the disease are influenced chiefly by the maximum weekly average temperature; that is to say, they are not proportional to the single maximum temperature, but dependent rather on a series of hot days accompanied by high



minimum readings, so as to cause a high maximum weekly average. They certainly are not dependent on the average temperatures of the air or of the earth-thermometer, nor on long continued moderately high temperatures during the whole summer quarter.

Table II shows the mean of the maximum weekly readings of temperature, rainfall, and sunshine, the number of deaths and annual death-rate for each of seven weeks of the summer quarter, July 30 to September 18, 1911, during which time the deaths from diarrhœa were in excess. In the week previous to August 5, the deaths in London from diarrhœa were only fifty odd; they rose suddenly during the beginning of August, and then fell gradually to the end of the summer quarter, irrespective of temperature.

Note in this table that although the mean of the maximum temperature was higher in the weeks ending September 2 and 11 than in the week ending August 28, yet there was a continued and gradual fall in the number of deaths from diarrhœa. The highest temperature ever recorded in England occurred on August 9, when the thermometer reached 100° F. in the shade, and the maximum temperatures were over 90° F. for nearly a whole week, bringing the maximum weekly average for the summer quarter up to 72·5° F. in the week ending August 12.

The meteorological figures are those recorded at Greenwich. The death-rates are per 1,000 living at all ages, reckoned as annual death-rates, during thirteen weeks of the summer quarter, July to September inclusive.

TABLE II.

	Mean weekly temperature	Rainfall	Sunshine	Deaths under 2 years	Annual death-rate
Week ending:					
August 5 ..	68·0° F.	0·06 in.	62·7 hours	318	3·8
" 12 ..	72·5° "	<i>nil</i>	82·5 "	548	6·2
" 19 ..	69·4° "	0·58 in.	75·3 "	629	8·2
" 28 ..	63·9° "	0·29 "	29·7 "	635	8·8
September 2 ..	65·3° "	0·41 "	61·2 "	537	7·9
" 11 ..	66·9° "	0·01 "	54·4 "	439	6·2
" 18 ..	60·3° "	0·41 "	50·7 "	368	5·0

Table III shows an analysis of the occurrence of 203 cases in the borough of Woolwich from August 1 to September 19. This table indicates the delay by mothers in bringing their children for treatment, a factor which accounts for many deaths that might otherwise be avoided. It shows, too, an enormous preponderance

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of cases occurring suddenly after the hottest day of the quarter, and a gradual fall in the number of cases. Between August 8 and 15, forty-seven cases were brought for treatment; from the 16th to 22nd, forty-two; and from 23rd to 29th, fifty-eight. But on inquiring in each case when the illness started, it was found that eighty-six started between the 8th and 15th, sixty-eight between the 16th and 22nd, and only twenty-seven between the 23rd and 29th. Now the hottest day of the year was on August 9, and the highest maximum weekly average in the week ending August 15. These 203 cases include only severe cases, milder cases occurring in the same families not being included.

TABLE III.

	Number of cases brought for treat- ment each week	Number of cases starting their attacks each week
August 1 to 7 .. .. .	9	9
"   8 " 15 .. .. .	47	86
" 16 " 22 .. .. .	42	68
" 23 " 29 .. .. .	58	27
" 30 " September 5 .. .. .	23	10
September 6 to 12 .. .. .	17	2
" 13 " 19 .. .. .	7	1

Table IV shows the age periods and the mortality at those ages in the 203 cases investigated. Of sixty-four cases under one year, only one was fed entirely on the breast, and in this one case the mother had suffered from diarrhœa the week before. In many families the youngest child, fed entirely on the breast, was the only member of the family to escape infection. These facts clearly indicate that the infection must be carried into the system from without, and are against the view held by some that heat is entirely responsible by upsetting the nervous mechanism of the bowel.

TABLE IV.

Ages	Cases	Deaths	Mortality : Percentage
Under 3 months .. .. .	5	1	20·0
From 3 to 6 months .. .. .	15	2	13·3
"   6 " 12 " .. .. .	44	2	4·5
"   1 " 2 years .. .. .	73	1	1·3
"   2 " 10 " .. .. .	43	<i>nil</i>	—
Over 10 years .. .. .	23	<i>nil</i>	—

There are three main factors in the causation of this disease, namely, (1) activity of bacteria, (2) variations of temperature, (3) contributory flies. The relation of temperature to the disease has already been discussed at length.

With regard to bacteria, there are many sceptics still to be found who maintain that all the cases are attributable to: (1) Increased irritability due to excessive heat, (2) teething, or to (3) eating indigestible food or unripe fruit. But the infectivity is clearly shown by the cases already described, and by many other similar cases in which a whole household is affected from the youngest to the eldest. In one family a child, aged 6 months, and a pensioner, aged 74, were equally affected with three others. In another the mother was attacked on August 25, and recovered in two days; her four children were all attacked on August 28. In yet another the three children were attacked on August 20, and the mother on August 21; of these the mother was the worst. Spot maps are interesting and prove a great deal in this direction. In two streets, each of forty to fifty houses, twenty families were affected, or nearly one quarter of the total number of houses in the street. Most of these families were on adjacent sides of the two parallel streets.

Again, the incidence of cases shows that when once the disease is started in hot weather it continues unabated for some weeks after cold and wet weather has set in. It also attacks many infants that have not yet reached the period of dentition, and occurs in many adults who have kept themselves on a very careful and regulated diet. Many children, it is true, do suffer from diarrhoea as a result of dentition, and many adults are affected by eating unripe fruit; but these are few compared with the numbers that occur epidemically in summer. Thus, if the infectivity of the disease be recognized there is every probability that bacteria will prove to be the exciting cause. No one as yet has definitely discovered the germ which is concerned in these epidemics; but looking at the intimate or almost exact proportion between temperature and incidence, and also to the sudden onset of the epidemic followed by a gradual fall in the number of cases, irrespective of meteorological conditions, we may presume that the germ is one of the natural flora indigenous to the intestine. Were this not so, but the disease due to an extraneous and specific germ as in cholera, enteric, etc., one would expect the rise in the number of cases to be more gradual at first, followed possibly by a secondary rise at a later period due to secondary infection from the first batch

of cases. Many writers on the subject have reported that in a few cases they found Shiga's and Gaertner's bacilli of dysentery, but no one has found them in a constant proportion of cases. It is not likely that these extraneous germs cause the disease, rather we should suspect one that is always present in every intestine, such, for example, as the *Bacillus coli communis*. Against the suggestion of an extraneous germ, too, is the occurrence of the disease everywhere in the country where the meteorological conditions are favourable, and where people are crowded together; moreover, the figures of incidence bear a fairly close proportion to the density of population. The disease does not occur epidemically in a few districts first and spread to others later, as we should expect were the causative organism not ubiquitous.

Dr. Peters, of Mansfield, in his investigations, estimated that 10 per cent of all the population in Mansfield had the disease at some period of the summer during which he made his notes. The causative organism, then, always present in the intestine, must under the meteorological conditions described previously be exalted to a high state of virulence. This increased virulence may be brought about at the commencement of the epidemic as follows:—

(1) Incubation in warm, damp soil outside the body, as soon as the ground temperature rises above a certain level.

(2) Exaltation of the organism inside the intestinal canal, by lowering the body resistance to it: (a) The heat lessens the metabolic processes of the body and therefore lowers the vitality by lowering the production of energy. (b) The heat causes a greater quantity of blood to spread over the surface of the body and reduces the quantity in the internal viscera. This, besides lowering the power of digestion, induces stasis in the liver and diminished flow of bile, the natural disinfectant of the intestine. (c) The digestion is impaired partly from defective metabolism and partly from diminished flow of blood to the viscera, and therefore ill-digested and unabsorbed food particles cause mechanical irritation to the intestinal mucous membrane and afford a suitable pabulum for the growth of organisms.

(3) The organisms may be intensified by "passage," i.e., by carriage from the intestine of one individual to that of another.

Dr. Peters, of Mansfield, is in favour of the first suggestion, that the organisms are incubated in the soil; but the incidence of cases as shown by distribution suggests that the second of these suggestions is responsible at least for the commencement of the epidemic; and possibly the third suggestion may be in the right

direction to explain the progress of the epidemic when once started.

The following are types of the localities in which 203 cases, investigated during seven weeks of the summer quarter, 1911, occurred:—

(1) Military married families, scattered singly or in small groups in barracks, each with its own w.c. and dust-bin. In many cases these quarters were in close proximity to stables.

(2) Military married quarters in large blocks, all the occupants using the same latrines and dust-bins, which were separated from the buildings.

(3) Military married quarters in large blocks in which there was one w.c. to every four quarters, situated within the building.

(4) Houses in thickly populated streets, mostly with a separate w.c. in rear of the house; the w.c. being used by more than one family in the house.

The least number of cases, in reference to type of locality, occurred in type (1), in barracks where married quarters were scattered; each had its own latrine and dust-bin, although many were surrounded by grass and soft earth, and others were situated near stables, eminently suitable for the incubation of germs in warm earth. The greatest number of cases occurred in the thickly populated streets with w.c.'s in the back yards, type (4).

If we compare the block married quarters, types (2) and (3), with each other, the cases were fewest in the quarters where all the latrines and dust-bins were outside the building and at least twenty yards away from it, where the same latrines were used by all occupants, and flushed at intervals by a caretaker.

A greater number occurred in those quarters in which the one w.c. was shared by four quarters, and was situated inside the building; in these the dust-bins were separated from the buildings by at least twenty yards, and each was common to twenty quarters. These buildings were surrounded for some distance by concrete and gravel, there being no warm earth or other suitable nidus for incubating germs. In one set of married quarters, comprising 120 quarters, or nearly 300 rooms, with outside latrines of the wash-through system, common to all and flushed at intervals by the caretaker, only three families were affected in the seven weeks; whereas in two parallel streets containing only forty or fifty houses each, the backs of the houses in one street being adjacent to the backs of those in the other, the maximum number of families, namely, twenty, was affected during the seven weeks.

These figures tend to disprove the suggestion that the organisms

are incubated in the ground ; they also show the importance of the position of w.c.'s in thickly populated buildings or streets.

#### FLIES, AND THE PART THEY PLAY.

Having shown the infectivity of the disease, and the most probable bacterial origin, one must investigate the method of transmission.

In the families most affected, both in regard to severity of disease and the number of members of the family seized, it was impossible to overlook the extraordinary number of flies. In many houses there was not a square inch of wall space or ceiling unmarked with the excreta of flies; and in several instances the peculiar odour of this excreted matter was overpowering; this was so well marked that unconsciously one began to measure the prognosis by the number of fly-marks on the wall !

Next we must attempt to demonstrate from evidence how these flies operate in carrying infection. Taking thickly populated streets, in two of which running parallel twenty families were affected, nine occurred on one side and two on the other. In the other street nine families were affected, six on one side and three on the other. In each case the side most affected backed on to the other street, so that three times as many families were affected on adjacent as on opposite sides. In yet another street there were seven families, with altogether twenty-three individuals affected on one side abutting upon another street, and only one individual on the opposite side of the street which was more open. Many of these families, though living next to, or one or two doors away from, another infected family, had no personal contact with infected persons.

Now, in the majority of these houses, the families "live" for the most part at the back, they eat in the kitchen, and use the front room only for visits of friends, doctor, etc. The w.c. in most of the houses is outside, at the back of the kitchen and scullery, and is used by all in the house. In the scullery the baby's cloths and napkins are placed in a pail or bath until they are washed out; the water in which they are washed is thrown out on to a gulley just outside the scullery or kitchen window. The food, milk, etc., is either in the scullery or kitchen. In the hot weather, flies, attracted by the smell of food and cooking in the kitchen infest the yard in enormous numbers; these may well carry infection from the w.c., the gulley, and the pail of soiled cloths into the kitchen and to the food. Presumably these flies also wander next door and across



to the backs of the houses in the parallel street and infect food in these houses; but these flies cannot so easily travel over the tops of the houses on one side of the road, across the road, and over the tops of the houses on the opposite side of the same street, so as to infect the food in the kitchens of these farther houses. Thus we see how the disease, once started on one side of the road, spreads along the same side and to the adjacent side of the street running parallel at the back.

In the few instances of infants which are being fed entirely on the breast suffering from the disease, one is nearly always informed that the mother had an attack or a "touch" of diarrhœa the week before. The most probable method by which such children are infected is the dirty habit of some mothers of putting the baby's comforter in their own mouths before giving it to the infant. These breast-babies may also be infected by the mother, when she is or has been suffering from diarrhœa, wiping the child's face or mouth, or her nipples, with unwashed hands; although here again the household fly, that delights to browse on the sleeping child's mouth and lips, may often be the cause.

Many writers lay great stress upon the infection being derived from cows' milk, but one finds in an epidemic that a large proportion of the infants affected have been fed on condensed tinned milk and have had no cows' milk at all, and many older children who do not get a drop of milk suffer severely; hence one comes to the conclusion that milk is not especially infective, but that all food may play the part of carrier.

Teething may play a minor and subsidiary part in the prevalence and spread of the disease; a large number of children will be found to be cutting teeth, for the tables show that 1 to 2 years is the commonest age-period in which the disease is contracted—this is the most active dentition period. It is this age prevalence that has led many to believe that teething is really the main cause. But as a large proportion of infants under the dentition period suffer, and while the number of teething children remains pretty constant the whole year round yet the incidence of diarrhœa is enormously increased in the summer months, it is evident that dentition has very little to do with the matter, although by lowering their powers of resistance it may make the children more susceptible.

#### PROGNOSIS AND MORTALITY.

The prognosis in cases of infective gastro-enteritis is one of the most difficult problems of the disease. One finds that severity of symptoms is no guide whatever. In about 35 per cent of cases

the motions contained blood ; in about 70 per cent the motions were of the rice-water type, offensive, and as frequent as every ten minutes. Yet a large proportion of these patients recovered in thirty-six hours.

Age, of course, is the most important factor in prognosis, infants under 1 year being the most difficult to cure. The tables show that the mortality is greatest under 5 months of age, and rapidly decreases as the age advances. The Medical Officer of Health of the Borough of Woolwich, in his report issued in 1910, states his opinion that the mortality of the disease is greatest when the disease is most prevalent, and the converse ; an opinion that is in favour of the multiplication of some germ, for the conditions that cause the disease to be more prevalent are just those which tend to make the germs multiply and make them more virulent, thus increasing the fatality.

Relapse is the greatest danger, and from the point of view of prognosis is the most unfavourable feature. Of six deaths in the 203 cases, four died after relapse. Of the 203 cases twenty-nine relapsed, about 14·3 per cent. It is important to recognize and treat all mild cases. In 15 per cent of cases where a child was brought for treatment, the history showed that one or other parent had had diarrhœa a week before, and had either recovered or was neglecting it. Had these first cases in adults been treated, the remaining members of the family might have escaped.

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## FIELD MEDICAL UNITS: THEIR MOBILIZATION, ORGANIZATION, ALLOTMENT, ETC.<sup>1</sup>

BY LIEUTENANT-COLONEL D. M. O'CALLAGHAN.  
*Royal Army Medical Corps.*

WHILE most officers have a practical knowledge of the subject of the mobilization, organization, and allotment of field medical units, it is especially desirable that all junior officers should familiarize themselves with it, and not leave it lightly to those who may have to accept all its responsibilities. Knowledge is good, but on mobilization, when we shall all be working at high pressure, it is especially useful, and very happy will be the lot of those commanding officers who find their subordinates not only willing but able to help.

Without quoting extracts from regulations, mention must be made of a few of the more important headings: Mobilization is the process by which an armed force passes from a peace to a war footing. It may be general or partial. For the latter, special instructions are issued from the War Office. In the case of a field medical unit, which is a new creation, the procedure is practically the same, though the stages of evolution towards a perfect war machine must necessarily be slower and the process more difficult. The place of mobilization is the place where a unit is made ready to proceed on active service, and must not be confounded with the place of joining, which is where regular reservists join on mobilization. The day of mobilization is, unless otherwise ordered, the day following that on which the order to mobilize is received from the War Office. A unit is considered to be mobilized when its personnel and animals have been completed to war establishment, the whole of its war outfit received, horses shod and harness fitted. The war establishment is the number of officers, warrant officers, non-commissioned officers and men, animals and vehicles with which the unit takes the field and which are to be maintained during the war, and takes effect without further authority from the first day of mobilization. Particulars can be found in War Establishments. The details left at the base are also shown there, and are defined in Field Service Regulations, Part II. The war outfit consists of: (1) War equipment, (2) clothing and necessaries, (3) regimental supplies, and (4) medical and veterinary equipment.

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<sup>1</sup> Précis of a lecture delivered to the officers of the Royal Army Medical Corps, Portsmouth District, February, 1914.

(1) War equipment is the whole equipment with which a unit takes the field, and consists of: (a) Personal equipment, comprising all that the soldier takes with him everywhere, even if transferred or attached to another unit, and (b) regimental, which is unit equipment; in fact, all the rest—vehicles, stationery, stores, etc., as shown in Army Form G 1098 series, and is drawn from the ordnance department.

(2) Clothing and necessities comprise the personal kit of the soldier, details of which can be found in Clothing Regulations, and Regulations for the Territorial Force.

(3) Regimental supplies consist of the rations and forage carried by units in the field. See War Establishments and Allowance Regulations.

(4) For medical and veterinary equipment see corresponding regulations. Medical equipment for field units is held at the place of mobilization or forwarded without requisitions.

#### HOW ALLOTTED.

The field medical units are cavalry field ambulances and field ambulances, and to save time this lecture is chiefly confined to the latter. Let us now consider how the personnel is provided. Officers are posted by the deputy director of medical services, acting under instructions from the War Office through the general officer commanding-in-chief. For the rest the War Office has fixed an establishment on the following lines:—

- (1) A proportion of serving soldiers.
- (2) A proportion of regular R.A.M.C. reservists.
- (3) A proportion of other reservists from three sources, namely:
  - (i) Reservists transferred from the infantry and Royal Garrison Artillery;
  - (ii) special reservists, category "A";
  - (iii) special reservists, category "B."

The serving soldiers are posted in peace to some unit, and are furnished with cards according to their sections and duties: Red for the nursing section; blue for the clerical section; yellow for the cooking section; and white for the general duty section. These postings are entered on Corps Form I, and care should be taken that men so allotted are acquainted with the work required of them on mobilization. The cards should be shown at kit inspections. The following are exempt: War Office clerks; the chief clerks of deputy and assistant directors of medical services; the personnel of the Army Medical Stores, Woolwich, Dublin, and Southampton, and of "D" Block, Netley.

The number of regular reservists allotted to each unit is shown

in Mobilization Instructions, Army Medical Service, Table IV, which includes 10 per cent for casualties.

The infantry and artillery reservists are ordinary reservists who receive three months' training on transfer, and after that eight days biennially. They join at their training centres. Category "A" represents the old Militia, and these reservists undergo six months' training on enlistment, followed by an annual training of fifteen days. They are posted by the officer in charge of records to the companies where their kits are stored. Category "B" are from the territorial R.A.M.C. They have to be efficient and present at their annual trainings, and they join at their own headquarters.

It will be seen from the above that a typical field unit is composed of divers elements. A stiffening of serving soldiers who should be well trained men, an almost equal number of regular reservists doubtless slightly rusty, and a very large proportion of special reservists, many of whom, even if well trained, are not perhaps as well disciplined or conversant with their duties in the field; and we should make a mental note here of the importance of the special reservist and the necessity for those who may at any time be in touch with him ensuring that he makes the best use of his all too limited training periods.

Horses are furnished and despatched to units under arrangement made by the deputy director of medical services. They arrive on the sixth day, and as the Army Service Corps details report on the fifth day they are ready to take them over on arrival and fit harness and mark horses the day after. This is new, and as some of us know, saves the officer commanding the unit considerable worry. I notice in Mobilization Regulations you are referred on this point to Remount Regulations, where you gain the interesting information that you will probably get a good many grey and white horses. Well, grey is a good colour; at least I have always found it so.

#### PREPARATORY MEASURES.

Railway time-tables for all units are prepared by the general officer commanding, showing details of all trains provided for personnel, horses, and material. A mobilization diary is prepared by the officer commanding the company, R.A.M.C., in conjunction with the officer commanding the Corps in the district or command and the general officer commanding, showing all the duties of everybody concerned as far as possible in the order in which they take place, from the first to the last day of mobilization, showing the date, time, and locality for medical examinations,

drawing of stores, etc. Enclosed in the same cover are mobilization orders for the carrying out of the duties by officers, warrant officers, and non-commissioned officers. These orders should be such that on receipt of them each responsible individual will know exactly what to do and how and when to do it without worrying others for additional information. Copies, with a copy of the diary and a list of documents such as returns, requisitions, indents, etc. (made out as far as possible), orders for reservists as to handing in certificates, marching to the inspection room, having their clothes marked and plain clothes disposed of, etc., and an index of contents are kept in envelopes addressed to units concerned. Unless one has seen some of these no idea can be formed of the work and care required to keep them up, especially as the alterations and amendments fully equal those of the more ordinary official books, and if it is borne in mind that at every centre not one but many units are mobilizing, their necessity and importance will easily be grasped.

The officer in charge of records keeps in touch with all reservists and allots them to various units; he keeps an addressed envelope containing complete instructions and a railway warrant for each man, which is posted at once on receipt of orders to mobilize. On this occurring, he prepares as early as possible a list of promotions to complete establishments. He forwards the documents of all reservists to officers commanding units, and carries on a voluminous correspondence with them during mobilization. If it is remembered that many reservists are continually notifying changes of address and that casualties are frequently occurring, some of the difficulties of an officer in charge of records will be appreciated.

#### THE OFFICER COMMANDING THE COMPANY.

The officer commanding the company, on whom the mobilization duties fall heavily, is not only responsible in peace for these preparatory measures, but also for the care and fitting (which should be checked at every training) of the clothing and boots of all reservists, also that the stores containing them are suitable and accessible, and he should test this whenever possible. He is responsible for the careful training of his serving soldiers in all capacities, and should offer them every incentive to work for advancement, carefully explaining to them that on mobilization promotions will be at once made from those who have qualified, and that a large number of additional non-commissioned officers will be required. Similarly he is responsible that all reservists are carefully trained and given every facility for learning their



duties during their trainings. On mobilization, if it be partial, he recalls all officers on leave and all soldiers on furlough. On general mobilization all ranks rejoin automatically. He arranges for the medical examination of serving soldiers and reservists (the examination of the latter used to be a preliminary, but is now a final one), and for the rations and accommodation of men joining. He clothes the reservists and obtains from them their life, identity, and reserve certificates, which he forwards to the regimental paymaster at Aldershot, and then sends them to units in accordance with orders received. He sends daily to the officer in charge of records a nominal roll of those who have joined and a statement of the remittances they wish sent to their families, messing charges, etc.

#### THE OFFICER COMMANDING THE UNIT.

Some people think the officer commanding the field unit has nothing to do; merely to walk in and find everything ready and all arrangements made; but when one considers the confusion and travail attendant on the birth of a new unit, the position is not so simple. Everything is no doubt arranged on paper. The mobilization orders, diary, etc., may be complete, but let us not forget that the officer commanding the company will have departed, together with his quartermaster and many of his subordinates, and the commander of the unit will probably find that many of the duties laid down are incomplete, and that details arriving from places of joining will for this reason be less advanced in their preparation than the schedule dictates. Apart from these "alarms and excursions" his duties are laid down in Mobilization Regulations, paras. 197-233. Briefly they are as follows:—

(1) If his establishment is not complete he must wire to the officer in charge of records for additional reservists, who may be supplied from "reliefs and miscellaneous" at the depot.

(2) He will send Army Form D 418 (separation allowance) to the record office, and Army Form 01796 (allotments of pay) to the regimental paymaster, a much harder task than it sounds; with them he sends also, if not already done, life, identity, and reserve certificates.

(3) He sends all medals, also if they wish it wills of soldiers, to the officer in charge of records.

(4) He will have to examine all documents of reservists so as to apportion qualified men to his various sections, and to make temporary promotions. He will then forward duplicate attestations, conduct sheets, and medical history sheets to the officer in charge

of records. He will retain Army Form B 103 (casualty form, active service) until he arrives at the theatre of war, when he will forward the forms with a nominal roll to the adjutant-general's office at the base. Army Form B 122 (field conduct sheet) is kept for use.

(5) He sees that all ranks are in possession of an active service pay-book, identity disk, and iron rations.

(6) He reports progress every evening through the regular channel to the general officer commanding, giving reasons for any departure from the normal.

He has a definite limited number of days to do all this and to mobilize, and he must never get behindhand. The time of departure is fixed and cannot be altered; ready or unready he must go, so it will be seen that in spite of cut-and-dried arrangements he has a fairly anxious time. I have been through it myself, and can assure those who have not that it is a high trial of one's personality and requires a cool head as well as organizing and driving powers. One's unit is not a finished car only requiring oil and petrol to keep it going; it is, to use an engineering term, an "unassembled" unit, and has to be "assembled" with the assistance in many cases of insufficiently trained mechanics. One cannot afford to sit comfortably with one's hands on the lever, but must don the overalls and work in the shops oneself.

The chief object of this brief account of the mobilization of field units is to arouse interest and stimulate a desire for a knowledge only to be obtained by personal effort. Everything has been so carefully thought out that it is hard to suggest any improvements; but improvement is generally possible, and I always like to see our juniors attack problems with open minds. As Descartes says: "In order to seek truth it is necessary once in the course of one's life to doubt as far as possible of all things." In doubting, young minds are brought to consider them, untrammelled by the prejudices and grooves of older men. May the results be good! For myself, I should like to see reservists joining at the place of mobilization, and I think that if a retired officer and non-commissioned officer were employed at each centre they would relieve officers commanding in peace, and there would be less confusion and a minimum of trouble on mobilization, while on departure of the units the officer commanding details would have an easier time in bringing order out of chaos with his remaining odds and ends. Bearing in mind also that our *raison d'être* is war, I consider that all officers should not only have full access to the secret mobilization documents but that their study should be enforced.

## United Services Medical Society.

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### THE SCOPE OF THE FIELD AMBULANCE AS A TRAINING SCHOOL.

BY MAJOR J. OLDFIELD.

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THE tendency of modern life is towards co-ordination, and the success of modern business methods depends upon the appreciation of co-operation in place of antagonism, of departmentalization in place of overlapping, of single control in place of multiple control, and of single-portal training with subsequent specialization in place of sporadic and varied and uncorrelated methods of education.

The business of dealing with the health of the Territorial Force in times of peace, and developing the business machinery so that it will automatically respond to the strain put upon it in time of war, is similar in principle and in essentials to all other responsible and important businesses.

The methods which have secured success by promoting harmony and economy and capacity for expansion in modern great businesses are worthy of consideration if we want as perfect an organization as possible for the medical administration of the Territorial Force. In my paper last year (*JOURNAL OF THE ROYAL ARMY MEDICAL CORPS*, April, 1913), I gave in detail the respective methods of training, the opportunity for experience and the general prospects of the regimental medical officers and the field ambulance officers, and pointed out that the only logical method of training was the one-portal system. Further consideration in the light of a subsequent camp, and discussion of this proposal with numbers of army officers, leads me not only to adhere to my suggestions of last year, but to carry them even one step further.

It appears to me that in order to secure harmonious working, to secure a complete understanding by every officer and man of his duties and responsibilities, to ensure that the work of every officer and man shall be under competent supervision, to enable every officer and man to know his definite chain of command, to provide for every officer and man thorough and standardized training, and to prevent overlapping on the one hand and hiatuses on the other we must have the field ambulance as the complete unit in charge

of all the personnel, and the duties connected with the health and the sanitation of the troops in peace and in war.

In my previous paper I drew attention to the inadequate training of the regimental medical officer and to the fact that he *need* never attend camp at all, and that when his battalion is up to full strength he would only be *allowed* to attend camp on alternate years, whereas the field ambulance officer is required to attend camp once in three years and pressure is brought to bear upon him to attend camp every year.

A regimental medical officer is a man to himself, he has little in common as to his duties with his fellow regimental officers, and therefore he is always to some extent an outsider in their discussions and their enthusiasms and their duties. On the other hand, a field ambulance officer is *homo inter pares*, he is an integral part of the machine, his comrades are his fellows in duty, in sentiment, in train of thought; if he fails he knows exactly upon whom his duty will fall, and this sense of camaraderie in work, in promotion and in responsibility has an effect upon him for zeal and for loyalty to his work and his unit which can hardly be overestimated.

The different life in camp makes all the difference in the attraction of camp, and the presence of comradeship is in my opinion one of the greatest of the forces which puts pressure upon a field ambulance officer to attend camp, and the absence of it is one of the chief causes of regimental medical officers pleading annual pressure of professional duties to account for their absence. I emphasize this because I look upon camp as the one absolutely essential method of training officers as well as men for their duties in peace and in war.

For the first ten years of service a medical officer should do at least fifteen days in camp every year, and his value to the Territorial Force would be more than doubled if he were able to do one month per annum. This brings me back again to the same point, namely, that the field ambulance is a better training school because very largely it attracts, and to a limited extent compels its officers to attend camp regularly, whereas the regimental medical officer is neither attracted nor compelled in the same way.

The second point is the important one of standardization. We heard so much of the success of American watches and American machinery a few years ago because of the simplicity of their construction. Every part, every wheel, every pinion, and every screw was so standardized that repairs and substitution of new parts for old became a matter of minutes instead of weeks. The

same holds good in a great machine like the army, which has to provide for enormous wastages, damages, and consequent transferences. All medical officers, therefore, should have a standardized training first and a specialized training superadded.

To specialize first is contrary to logic and to common sense. A medical officer ought to be at home in any part of the army corresponding to his rank because his duties carry him to all parts of the army. At present a regimental medical officer would be at sea if posted to a field ambulance because he has specialized as a regimental officer instead of having been standardized by field ambulance training.

The question of command is one of supreme importance in all successful organizations. No good man objects to obey the commands of those whom he knows to be authorized to command him, but no good man is willing to receive orders from divergent sources. At present the position of the regimental medical officer is not unmistakably clear with regard to his chain of command, and friction has arisen which should never arise.

When a field ambulance is encamped with the infantry battalions of its division the extent to which the regimental medical officer of each battalion is subject to the command of the officer commanding the field ambulance, is a question which in my opinion has never yet been clearly defined. The whole problem would be solved if it were the duty of the officer commanding the field ambulance to post an officer to each battalion in camp. Such officer would be a standardized man, and would be posted to definite duties laid down for him to carry out, would be responsible to his commanding officer for their due discharge, and the colonel of the regiment would have no responsibility for things he has little time and opportunity for understanding. This officer would mess with his field ambulance, would throughout camp be an integral part of his unit, and would be able to compare notes, learn experience, and gain the stimulus of competition by thus constantly meeting with his fellow medical officers posted to other battalions, and his fellow officers working in the field ambulance.

This constant rotation of duties, sometimes with the field ambulance and sometimes (whether for the day or the week or the whole camp or the whole year) with the regiment, would secure the correct correlation and understanding of all the working of the machinery which is so essential for its success.

The present system works equally badly with regard to regimental stretcher-bearers. The regulations are as follows for an infantry battalion :—

“Two privates in each company are stretcher-bearers, making sixteen stretcher-bearers for the battalion, who are bandsmen ; also two orderlies for the medical officer, one of whom is a lance-corporal trained to the duties and placed under the orders of the medical officer.” Again: “it is ordered that in every unit a sufficient number of men will be trained to supply the stretcher-bearers, men for sanitary duties, etc.” Again: “classes for instruction in stretcher exercises as laid down in the King’s Regulations will be held under regimental arrangements for the purpose of training the stretcher-bearers required by Territorial Force establishments and such others as it may be thought desirable to train to this duty.”

Now these stretcher-bearers are not men of the R.A.M.C. and therefore their training does not come under the medical directorate (excepting in so far as the regimental medical officer may be instructed by the assistant director of medical services to train them) but comes under the battalion commanding officer. Now the battalion commanding officer wants all his men in the ranks, and he knows too that the study of music does not stimulate a man to hunt for wounded, or to love sick nursing, so that he has to put up with bad music from enthusiastic first-aiders, or to wink at a good band knowing nothing about stretcher-bearing! Yet the whole machinery of the medical organization is upset and is out of gear if the regimental medical work is not done.

The stretcher-bearers should get their special training in camp ; but if there is no regimental medical officer in camp, there is no provision for their training there. If the regimental medical officer were posted from the field ambulance it would be his duty to train these men during camp, and it would be quite easy for him to do this, drilling them on the ground of the field ambulance. Every battalion would send its sixteen men, and one regimental medical officer daily in turn (assisted by the non-commissioned officers of the field ambulance and the regimental medical officers’ non-commissioned officers) would take command and would learn and teach at the same time.

All who have had to do with the Territorial Force know the difficulties connected with regimental stretcher-bearers—the difficulty of enlisting them, the difficulty of drilling them, and the difficulty of getting them when you want to drill them. These difficulties will always be considerable, but if the medical organization of the Territorial Force is to be a real thing and is to be prepared for service it must not be forgotten that regimental medical service is an essential part of it, and that if the wounded



man is not picked up by the regimental stretcher-bearer, he will never reach the field ambulance, and all the perfection of organization of the ambulance will be wasted.

I had a case in point during our camp at Maldon in 1913. I was in charge of that portion of the field ambulance which was detailed with the defending force, and although I arranged my aid posts and dressing station and lines of carriage to the nearest village and the nearest station, and had the assistance of a detachment of the Red Cross, the whole scheme lacked the pivotal regimental medical officers and regimental stretcher-bearers, so that in real warfare there would have been a serious hiatus and the wounded soldiers would have been the sufferers. Had the battalions been officered from the field ambulance and the stretcher-bearers been trained by them this serious mishap could not have occurred. I emphasize this the more because in the criticisms of the day's work the general drew no attention to it, and apparently, in noting on the work of the field ambulance, had failed to observe the absence of the regimental pivot.

Lastly, a word with regard to water-men, and sanitary men, and medical officer's orderlies.

The regulations governing them are, condensedly, as follows:—

“In addition to the personnel of medical units, N.C.Os. and men of the R.A.M.C. will be attached on mobilization and for annual training to combatant units for water purification and disinfection duties as well as to assist the regimental medical officers in the field. . . . Whilst so attached these men will, subject to the regimental C.O., be under the order of the regimental medical officers.

“The numbers of the N.C.Os. and men required . . . form an addition to the establishment of field ambulances.

“This distribution for annual training among the combatant units to which they will be allotted will be arranged by the A.M.O.

“Classes will be held under regimental arrangements for N.C.Os. and men forming regimental sanitary squads for instruction in the disposal of excreta and refuse, in camp cleanliness, and in sanitary police duties to fit them to perform these duties in camp and on active service.”

We have here three classes of men—men who deal with the purification of water, men who deal with skilled disinfecting work, and men who inspect for and destroy refuse. In the Territorial Force the first is the least important, since the Territorial Force

is raised for England where a good water supply would be generally available; as a recruiting ground for the Expeditionary Force it is important to lay great stress on water training. Apart from the actual pioneers who feed and stoke the incinerators, the members of all three classes should be trusty men, well-trained men, and well-supervised men, for it is in these points that arise the differences between a healthy army and an army decimated by disease. All these men, therefore, should form an integral part of the field ambulance and should be posted from the field ambulance to the various battalions during camp, but should remain members and under discipline of the field ambulance during the whole period. The result of having them as supernumeraries to the establishment of the field ambulance is that they are not enlisted at all, whereas if the field ambulance was bound to provide for the water purification, sanitation, etc., of regiments with which it was encamped it would become necessary to train a certain number of men for these duties.

At present, so far as I can actually determine, the onus of a clean camp falls in each battalion upon the quartermaster, whereas it should fall on the field ambulance. The pioneers should be provided regimentally, but the sanitary policeman referred to in regulations should be detailed from the field ambulance. I venture, therefore, to sum up my position by saying that for the sanitary and medical administration of the Territorial Force to be adequately carried out:—

- (1) There should be a standardization of medical officers.
- (2) The field ambulance should be the one portal of training a command.
- (3) The field ambulance should train and supply all medical and sanitary personnel to every unit of the division.
- (4) When a field ambulance is encamped with a battalion, a brigade, or a division, the personnel it provides should remain a part of the field ambulance for administrative and messing purposes.

#### DISCUSSION.

The PRESIDENT thanked Major Oldfield for his most interesting paper, and wished that it had been longer.

Lieutenant-Colonel SALISBURY SHARPE said that he himself was an officer commanding a field ambulance; he did not know whether the speaker was a regimental medical officer or an officer of a field ambulance, but thought from his remarks that he was the former. The

whole medical personnel of a division was under one commander, the A.D.M.S., who was responsible for the training of all officers and men under him. The O.C. field ambulance only commanded a part.

As regards the bandsmen and the regimental medical officer, he had trained them, and quite agreed with Major Oldfield that both required more training than they got at present. But if all these duties were to fall to the officer commanding a field ambulance he would have more to do than he could manage. A great deal of training had to be done already, and many and various duties had to be taught. On one point he agreed, and that was that the regimental medical officer should undergo some training with the field ambulance. The regimental medical officer should be under the same rules as other medical officers and attend camp every year, and should be attached to a field ambulance either every alternate year or one year in three.

Colonel HARPER thought there was one point on which the speaker was under a misapprehension: the field ambulance is a divisional unit and does not belong to a brigade. The senior medical officer with a brigade is the senior medical officer of the brigade. On one occasion he had claimed to be the senior medical officer with a brigade when he was serving with a field ambulance, and he had soon found out his mistake. There was a good deal to be said for the idea that a regimental medical officer should be trained with the field ambulance, but there were objections; two of these were that this would entail an alteration in regulations, and when a man applied to join the Territorial R.A.M.C. he had to name the unit to which he wished to be attached. If it were possible regimental medical officers should be attached in turn to field ambulances. At present this was so if there were vacancies, but if there were no vacancies and medical officers were attached they lost all their pay and allowances. According to regulations a regimental medical officer attached to a unit had nothing to do except attend camp; he should have to put in so many drills every year and in this way would learn something. He would like to put the matter in another way and consider what the duties of a regimental medical officer would be in time of war; he held that they would be the duties of a sanitary officer. We must not take for granted that the water supplies in this country were good, for instance. In time of war *the* important thing would be sanitation.

As regards the band, they kick at having to do stretcher drill. At one camp he went to the general and told him that some of the bandsmen knew their drill and others did not, and he got the general to order the bandsmen to attend every day for two hours, and they let the men go as soon as they knew their drill. Unfortunately, as a consequence of this many of the bandsmen left after the first week in camp.

Major FREEMAN said that he had been a D.A.D.M.S. for six years. He thought Major Oldfield's ideas good in theory, but would not work in

practice. The ideal would be like the R.A.M.C., but this was not feasible because men joined the unit that they liked and would resign if not allowed to do what they liked. He admitted that the regimental medical officer was a very isolated person, but this was altering as they were getting in young and keen men. He joined issue with the speaker on one point, and that was Major Oldfield seemed to think that all the training the regimental medical officer got was while in camp, whereas the camp was only the finishing point of a year's training. In his division the A.D.M.S. allowed officers to join regiments and vice versa. Major Oldfield's schemes would put a great strain on the field ambulances. At present the training of the regimental stretcher-bearers was unsatisfactory, not because they are bandsmen, rather the reverse, because bandsmen are generally intelligent. In many camps the bandsmen were sent to be trained with the field ambulance.

The regimental medical officer knew something of the work he had to do and the powers he had; he could go to the officer commanding the regiment and insist on having the bandsmen sent to him for training. The officer commanding the regiment was responsible for the sanitation, the medical officer was not because he had no executive powers, but the medical officer was responsible to the officer commanding. If the stretcher-bearers were trained in the field ambulance as a rule, and the field ambulance did not happen to be near the regiment's camp then the whole scheme would fall to bits.

Men in camp should have as much medical work to do as possible; any cases of disease or injury should be treated in camp, if this was at all possible without retarding their recovery; he thought there was nothing as good as this for stimulating keenness. At present there was every facility for the interchange of officers between the field ambulances and the regimental medical establishments, and this was most important and desirable.

Colonel HARRISON said that nearly all the important points had been dealt with. He thought it would be a good arrangement if regimental medical officers could be attached to field ambulances as supernumeraries with pay. In other cases the field ambulances might be a long way away from the regiment and if the regimental medical officer was attached to the field ambulance and messed with it he would fare badly as regards food. He thought that there was a tendency to belittle the work of the regimental medical officer; this should not be the case as on mobilization the regimental medical officer would be of the greatest service, and if he were efficient he would do a great deal for the service, more in fact than any one else.

Captain DUNKERTON said that regimental stretcher-bearers should be fully trained before going into camp. During the year the regimental medical officer had nothing to do except recruit and train his stretcher-bearers. He found that the regimental medical officers knew enough

about a field ambulance after passing "A" and "B" to carry on their duties satisfactorily.

Colonel SKINNER said he did not think there was much more to be said on the subject. He quite agreed that the field ambulance was a divisional unit. He would like to impress on them the importance of sanitation; every medical officer should be a specialist sanitary officer. He quite agreed with Colonel Harper that sanitation should be included in the syllabus for certificates "A" and "B."

Major OLDFIELD, in reply, said he thanked all the speakers for the interesting discussion. He said in reply to Colonel Sharpe that he was a field ambulance officer. He quite admitted that the whole administration of a division was under one command, i.e., the A.D.M.S., but that did not affect his contention that the regimental stretcher-bearers and the sanitary men should be trained in the field ambulance; also the A.D.M.S. only came in very indirect contact with the regimental medical officer. He contended that the field ambulance should train the regimental stretcher-bearers, and not that the field ambulance should supply them.

At present the regimental stretcher-bearers were not trained before they came to camp, or when they were in camp; as Colonel Harper had said, they disappeared if one tried to train them. Colonel Sharpe said that the field ambulance would have to be enlarged if this was to be carried out. Well, why not? It is just as easy to take 200 into camp as 100. While quite admitting that the field ambulance is a divisional unit, that did not alter the fact that the regimental medical officer should be trained in the field ambulance. The only difficulty in regard to this seemed to be the messing, and this would only occur if the field ambulance was a long way away.

Colonel Harper said that the duty of the regimental medical officer was mainly sanitary; but this was not peculiar, as all officers would have a great deal of sanitary work to do. He thought that if an examination in sanitation was added to the syllabus for certificates "A" and "B" they would get fewer officers than they had at present. He did not agree with Major Freeman's remarks that medical officers would take exception to being changed from the field ambulances to regiments, as no doctor knew before he joined what were the duties of the medical officers with the various units.

Major FREMANTLE wrote: "I intensely regret that your paper is fixed for a time when I fear that many men, like myself, will be out of town. May I say in advance that I am cordially in sympathy with the synopsis of your paper. It is as a result of the South African War that the field hospital and bearer company have been united into one unit, that the Territorial Force R.A.M.C. has been formed and innumerable improvements have been made in the Army medical services. It is in keeping with this process that we should concentrate our organization of all

medical services in the Territorial Force on the field ambulance, both for officers and for men. For this purpose it seems to me that it will be necessary to have one officer specially detailed and qualified for sanitary duties and sanitary instruction in each field ambulance. Another suggestion I would make is that, inasmuch as the Territorial Force is only to operate in this country, where water-supplies, sound in quality and ample in quantity abound, water duties are of far less importance than in the Regular Army, and there is no justification whatever for water-duty men as such. I am convinced, moreover, that sanitary men, including those at present kept isolated for water-duty purposes, should be essentially members of the field ambulance and only detailed for their sanitary duties while still messing in camp with the field ambulances."





## Clinical and other Notes.

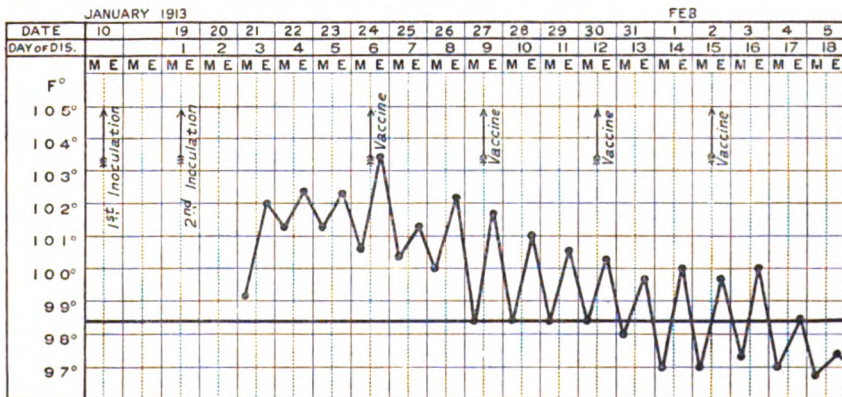
### A NOTE OF THREE CASES OF ENTERIC FEVER INOCULATED DURING THE INCUBATION PERIOD.

BY CAPTAIN W. P. MACARTHUR.

*Royal Army Medical Corps.*

CASES of enteric fever which happen to have been inoculated prophylactically during the incubation stage of the disease are of the greatest interest from their bearing on the prophylactic inoculation and the vaccine therapy of typhoid fever. There are two such cases recorded in the "Report of the Anti-typhoid Committee," and I give below notes on three similar cases which have come within my experience. In each of these the circumstances were the same—a request from a civil practitioner to make a blood-culture in a case of possible enteric, the culture proving positive. I treated the patient with a vaccine in consultation with the family doctor, and also inoculated the contacts. In three such instances one of the contacts shortly afterwards showed symptoms of the disease, when the procedure was the same as in the original case.

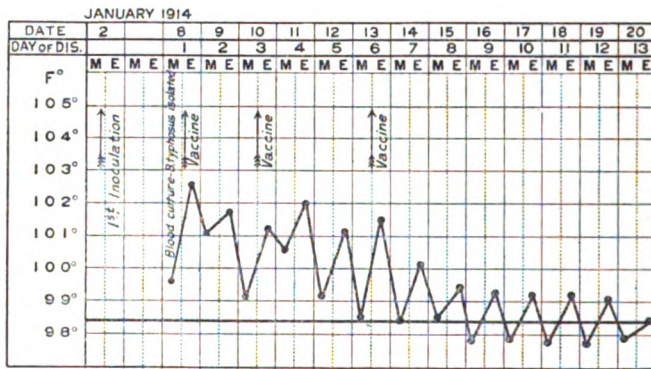
*Case I.*—A French boy, aged 12. Two of his brothers were attacked with enteric, the second of whom showed his first symptoms on January 10, 1913. On this day the remainder of the family received



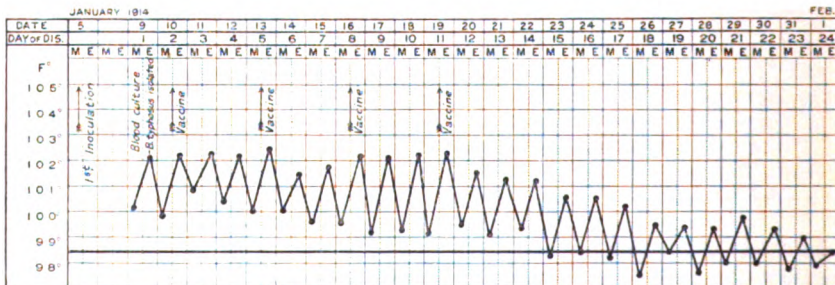
their first inoculation, followed by the second dose on January 19. On January 20 and 21 the boy in question showed symptoms resembling those which usually follow anti-typhoid inoculation, but as these had not abated on January 23 a blood-culture was made, and *Bacillus typhosus* isolated. Careful inquiry left no doubt that the boy received his second inoculation on the first day of the disease. The attack ran an extremely

mild course, the morning temperature being normal on the ninth day. At the height of the fever the patient was prevented with great difficulty from indulging in violent romps with one of his convalescent brothers who shared the same sick-room. During convalescence he had a rise of temperature lasting for about two days; this appeared to be due to some gastric disturbance following his first solid food. Otherwise convalescence was uneventful.

*Case II.*—A French girl, aged 9. This child received her first inoculation on January 2, 1914. On the morning of January 8 she complained of a headache, and her temperature was found to be 99.6° F. She was given an injection of her brother's vaccine—she was a contact



of her brother's—and a blood-culture was made with a positive result. For the first day or two the patient complained of a slight headache, and of "feeling tired"; after the third day there were no symptoms of any kind (other than the pyrexia), and she clamoured for food and was kept in bed with difficulty. Convalescence was uneventful.



*Case III.*—A Frenchman, aged 45. He received his first inoculation on January 5, 1914, on which day he was in his usual health. The symptoms following his inoculation—they were of the usual degree of

severity—make the date of onset difficult to fix, but subsequent inquiries indicate January 9 as the first day of his disease, on which date a blood-culture was made, and *B. typhosus* isolated. The disease ran a longer course than in the other two cases, but the chart gives a very poor idea of the mildness of the attack. After the first few days the patient was perfectly comfortable, talked and laughed, and, as in the other two cases, there was nothing except the temperature to indicate his complaint. About the middle of the attack he remarked: "If this is typhoid fever I can't understand why we Mauritians are so frightened of it!" Convalescence was uneventful.

Vaccines would probably be used more commonly in the treatment of typhoid fever only for the fear of inducing a negative phase. Although the prophylactic dose is considerably larger than an initial curative one, there is no indication whatever of the production of any negative phase in the above cases inoculated during the incubation period. On the other hand, there appears to have been quite an opposite effect, as is witnessed by the extraordinary mildness of these attacks, for in Mauritius enteric fever tends to run a much longer course than at home.

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#### A SHORT SUMMARY OF SURGICAL OPERATIONS PERFORMED AT THE MILITARY HOSPITAL, GIBRALTAR, DURING THE YEARS 1912 AND 1913.

BY MAJOR R. C. WILSON.  
*Royal Army Medical Corps.*

THE total number of operations performed was 271. This number does not seem very large, but there is only the garrison of Gibraltar to draw from, with an average strength of 3,660. The number also represents all the operations that could be performed, as no cases were sent elsewhere for operative treatment. Three officers had operations performed when at home on sick leave. There seems to be an idea in the lay mind that wounds do not heal so well in a warm climate as they do at home. This, as far as Gibraltar is concerned, is wrong, as in my experience all fresh wounds heal as well here, if not better, than they do at home. All the clean operation wounds, with the exception of one case of varicocoele, healed by first intention, and the stitches were removed on the eighth day.

#### NOTES ON SOME OF THE MORE IMPORTANT CASES.

*Operations for Appendicitis.*—Of the eleven cases four were operated on in the acute stage, and the abscesses drained in the usual manner. In one of these cases a counter opening had to be made in the flank. In one case a concretion was found in the abscess. Six of the cases operated on in the quiescent stage healed by first intention. In the



	Number of cases	Successful	Partly successful	Failed	Died	
Appendicitis .. ..	11	11	—	—	—	—
Hernia .. ..	18	18	—	—	—	—
Exploratory laparotomy	2	2	—	—	—	—
Excision of internal semi-lunar cartilage	6	6	—	—	—	See Cases IX and X.
Varix .. ..	9	9	—	—	—	—
Psoas abscess .. ..	1	1	—	—	—	See Case VII.
Piles .. ..	11	11	—	—	—	—
Empyema .. ..	3	3	—	—	—	See Cases V and VI.
Union of tendons ..	2	1	—	1	—	Wound very septic.
Stretching sciatic nerve	1	1	—	—	—	See Case I.
Amputations .. ..	5	5	—	—	—	Four were for injuries to fingers and one for hammer toe.
Perforating duodenal ulcer	2	—	—	—	2	See note.
New growth (non-malignant)	4	4	—	—	—	—
Varicocele .. ..	5	5	—	—	—	—
Hydrocele .. ..	3	3	—	—	—	—
Aspiration of knee-joint	2	2	—	—	—	Both done for the purpose of diagnosis.
Examinations under chloroform	2	2	—	—	—	One to examine a hip-joint and the other for a suspected case of malingering.
Removal of foreign bodies	4	—	—	—	—	Three were for removal of needles and one to remove an india-rubber teat from child's nose, which had been there for six months.
Fistula in ano .. ..	3	3	—	—	—	—
Fissure of anus .. ..	3	3	—	—	—	—
Bursal cyst .. ..	2	2	—	—	—	—
Sebaceous cyst .. ..	11	11	—	—	—	—
Excision of glands ..	20	20	—	—	—	—
Perineal abscess .. ..	1	1	—	—	—	—
Abscess .. ..	26	26	—	—	—	—
Cellulitis .. ..	1	1	—	—	—	—
Reduction of dislocation (open method)	1	—	1	—	—	The tendons were partly divided, but it was impossible fully to reduce the dislocation. He had, however, a useful thumb.
Hammer toe .. ..	2	2	—	—	—	—
Inflammation of connective tissue	2	2	—	—	—	—
Necrosis .. ..	1	1	—	—	—	—
Onychia .. ..	10	10	—	—	—	See note.
Phimosis .. ..	14	14	—	—	—	—
Phagedæna .. ..	2	2	—	—	—	—
Tracheotomy .. ..	1	—	—	—	1	He suffered from fracture of base of skull and compound fracture of lower jaw.
Opening knee-joint ..	1	1	—	—	—	See Case X.
Caries, dentine .. ..	7	7	—	—	—	—
Epididymitis .. ..	1	1	—	—	—	—
Paraphymosis .. ..	4	4	—	—	—	—
Synovitis .. ..	1	1	—	—	—	Very chronic case, and was treated by actual cautery with good results.
Mastoid antrum .. ..	1	1	—	—	—	See Case VIII.
Submucous resection of nasal septum	3	3	—	—	—	Two on adults, and one on a child aged 7.
Maxillary antrum ..	1	1	—	—	—	See Case III.
Hypertrophy of turbinal bones	3	3	—	—	—	—
Removal of tonsils ..	8	8	—	—	—	—
Removal of tonsils and adenoids	48	48	—	—	—	—
Nasal polypi .. ..	2	2	—	—	—	—

other case the appendix was found to be adherent in its whole length to the posterior wall of abdominal cavity. The tip of the appendix had to be left behind, as it was impossible to remove it. A drainage tube was inserted and left *in situ* for twelve days. The wound then healed by granulation. A concretion was also found in this appendix.

*Inguinal Hernia.*—The operation performed in almost all the cases was a modified Bassini. In the last two cases operated on the sac was well cleared, ligatured, and divided in the usual way and let go. No displacement of the cord was made, and the wound was stitched up. All the cases healed by first intention, and did well.

*Perforating Duodenal Ulcer.*—The two cases operated on died. One case came to hospital about eighteen hours after the perforation took place. He then had acute general peritonitis. The other case died the day after the operation from hæmorrhage from the ulcer.

*Excision of Semi-lunar Cartilage.*—All cases did well, and returned to their duties. All the patients operated on suffered from intense pain in the joint for about twenty-four hours after the operation, and had to be given hypodermics of morphine to relieve it.

*Onychia.*—This very common complaint amongst soldiers was treated as follows with excellent results. The nail was first removed, then a wedge-shaped piece of flesh, including about one-eighth of an inch of matrix, was removed from both sides. The wounds were closed by one suture each. No cases recurred.

*Throat, Nose, and Ear.*—Most of the operations were performed on children, and nearly all for adenoids and tonsils. The three operations for removal of part of nasal septum by submucous resection were all successful. One of the operations was performed on a child aged 7.

*Skin Preparation.*—At first the iodine method was employed. The iodine stained patients' clothes and the towels used at the operation, and on several occasions, when the solution was fresh, the vapour from the iodine caused intense irritation to the operator's eyes. The procedure adopted for the past year has been as follows :—

(1) The patient has a warm bath the day before the operation, and the area to be operated on is well washed with carbolic soap.

(2) A few hours afterwards, when the skin is dry, the area is swabbed with a solution of biniodide of mercury in *sp. vini meth.*, strength 1 to 500, and covered with a piece of sterilized lint.

(3) The lint is removed on the operating table and the area again scrubbed with the biniodide solution.

Biniodide does not make a mess, and does not irritate the operator's eyes.

*Case I. Stretching Sciatic Nerve.*—Gunner G. admitted to hospital suffering from neuralgia of the left sciatic nerve. The date of onset was about two years ago, and he had been admitted to hospital several times. He improved each time under medical treatment, but never quite got rid

of the pain. The sciatic nerve was exposed for about four inches of its length, and well freed from surrounding tissues. The nerve was stretched by placing four fingers under it and applying sufficient force to lift the left buttock off the table. The wound healed by first intention, and he was discharged to duty quite free from any pain.

*Case II. Liver Abscess.*—Private C. was admitted in a very weak and debilitated condition, and found to have an abscess in the right lobe of liver. The abscess was opened and drained. The patient did fairly well for a few days, but then relapsed into the condition he was in before the operation. A week after the first operation he was again explored and another abscess found. He was treated with polyvalent anti-streptococcus serum. He did not do well; the wounds showed hardly any signs of healing, and he died four days after the second operation. An examination made post mortem showed some recent ulcerations and thickening of the cæcum and ascending colon. There was a large abscess cavity in the right lobe, freely communicating with the operation wound. The upper portion of the right lobe and the right lung were adherent to the diaphragm. There was fibro-purulent pleurisy on the left side and turbid fluid was present in the right pleural cavity. Sub-pleural abscesses were also found in both lungs.

*Case III. Abscess of Maxillary Antrum.*—Serjeant T. suffered for several years from headaches and pain over the left eyebrow. The headache was not constant, and did not respond to medicines. Now and again he had a discharge from his nose. The antrum was tapped through the maxillary plate and found to contain pus. As a preliminary step to the operation the anterior third of the left inferior turbinal was removed. A week afterwards an opening was made into the antrum below the attachment of the inferior turbinal. This opening was enlarged in front and behind by a special punch forceps. The result was a permanent opening into the nose at the level of floor of the antrum. The patient returned to duty quite recovered.

*Case IV. Liver Abscess.*—Private N. was admitted to hospital with a pain over the liver. Liver abscess was diagnosed. A portion of the eighth rib was removed, and the abscess drained; the wound was completely healed five weeks after operation.

*Case V. Empyema.*—Private B. was admitted to hospital with broncho-pneumonia. Twelve days after admission he was operated on for empyema under a local anæsthetic as he was too weak for a general one. About two pints of a dark, watery, evil-smelling fluid was removed. As he did not improve much after the operation he was given polyvalent anti-streptococcus serum. The cavity was irrigated, and three weeks after the operation the wound was allowed to close up. A week afterwards it had to be re-opened, as his temperature began to rise. A vaccine was then made from the patient's pus and given in gradual doses up to 200 millions. Three weeks after the second operation the wound



was again healed up and remained so. He made a complete recovery and was sent to England for a change.

*Case VI. Empyema following Appendicitis.*—Private H. was admitted to hospital with acute appendicitis. A small appendix abscess was found adherent to the wall of the abdominal cavity; the abscess burst on manipulation; and a large drainage tube was inserted. The abscess drained well for a few days, and then the discharge stopped. He was again given an anæsthetic and the wound examined; it was found necessary to make a counter opening in the right flank to drain the abscess properly. A fortnight afterwards it was found that the lower part of the right side of the chest was dull. An exploring needle was inserted and pus found. A portion of rib was removed and a tube put in. Seventeen days afterwards the empyema wound was quite healed up and the temperature was normal. The appendix wounds healed up in a very short time and the patient made a good recovery.

*Case VII. Psoas Abscess.*—Serjeant W. was admitted to hospital complaining of pain in the left iliac fossa and upper part of the left thigh. He had had pain in the left leg for over a year. There was no swelling to be seen or felt. He is a farrier by trade, and stated he had not received any injury. His temperature was normal on admission, but began to rise at once and ranged between 103° and 99° F. for three weeks. A swelling appeared in the left iliac fossa a fortnight after admission. In the meantime his blood was examined for the *Bacillus typhosus* and the *Micrococcus melitensis*, with negative results. The swelling increased and the temperature remained up. On the twenty-fifth day he was transferred to a surgical ward for operative treatment. An exploratory incision was made, and a large abscess found behind the psoas muscle. An opening was made into the abscess through the left flank and a tube inserted. The exploratory incision was then closed. The pus was examined for the tubercle bacillus, but with a negative result. Twenty days after the operation the discharge ceased, and the wound healed. His temperature dropped to normal after the operation, and remained so.

*Case VIII. Mastoid Abscess.*—Gunner L. was admitted to hospital with sore throat. Four days after admission he was seized with pain in the left ear, and a discharge appeared. The discharge stopped on treatment, but a few days later he again had severe pain in the ear. There was swelling over the mastoid, and bulging of the posterior wall of the external auditory meatus. A modified Stacke's operation was performed at once. The mastoid cells and antrum were found full of pus. The patient made a good recovery, and had good hearing in that ear.

*Case IX. Dislocation of the Internal Semi-lunar Cartilage.*—Gunner F. was admitted to hospital to have his internal semi-lunar cartilage removed. He was a footballer, and almost every time he played that game he dislocated the cartilage. Under chloroform the cartilage was removed through a small U-shaped incision, the stitches were removed on the

eighth day. Three weeks after the operation the patient was discharged from hospital able to do his full duty.

*Case X. Dislocation of the Internal Semi-lunar Cartilage.*—This was a case in which the knee-joint became infected after the skin wound had healed and stitches had been removed. Lance-Corporal M. was admitted with a dislocated cartilage, the knee-joint being very swollen and painful. As the joint was so swollen it was decided not to try and reduce the cartilage for a day or so. A few days afterwards I tried to reduce it, but failed. I made several more attempts on subsequent days without success. The patient asked to have an operation; so when all the swelling had disappeared, the cartilage was removed under chloroform. The wound healed by first intention and the stitches were removed on the eighth day. A certain amount of synovitis appeared in the joint a few days after the operation. The synovitis increased after the stitches were removed, and the temperature went up to 102.2° F. On the twelfth day the joint was opened by two lateral incisions and found to contain a thin light yellow fluid. The original operation wound was healed. The joint was irrigated with about two gallons of saline, and two tubes were inserted. These tubes were left in for forty-eight hours and then removed. The joint was not again irrigated. There was no discharge. A fortnight afterwards both wounds were quite healed, and patient was up and walking about. He left the hospital quite recovered and with the full use of his leg.

*Case XI. Colic simulating a Perforated Duodenal Ulcer.*—Gunner H. was sent to hospital about 1 p.m., complaining of severe pain in the abdomen. He had been drunk the night before. The pain in the abdomen began some time in the early part of the morning. He stated that he had suffered from indigestion for the last eighteen months, pain coming on about two hours after food. His temperature was 100.4° F. and pulse 120; the abdominal wall was rigid; liver dullness was normal. He complained of very severe constant pain all across the upper part of abdomen. The patient was watched for four hours. The temperature rose to 101° F., the pulse was 112, and respirations 24. The abdominal wall never relaxed and the pain remained constant. He began to get a slight hiccup. A consultation was held with three other medical officers, but a definite diagnosis could not be arrived at. An exploratory laparotomy was performed at 5.30 p.m., the incision being made above the umbilicus. Nothing abnormal was found except that the stomach was very much inflamed, the veins being engorged and about the same size as a lead pencil. Even under the anæsthetic the abdominal wall did not fully relax. The wound was closed and he was given a hypodermic injection of morphia. One of his friends told me that when he got drunk he always put bits of coal, small stones, etc., in his mouth, and pretended to eat them. He had a good night. Next morning he seemed much better, and was given a large turpentine enema, and the

stools resulting were examined. No foreign bodies could be found, but the stools contained a large quantity of undigested raw apples. He got an acute attack of bronchitis after the operation, made a good recovery, and left the hospital twenty-four days after admission.

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#### NOTES ON FEVERS IN ADEN.

BY MAJOR L. F. SMITH AND CAPTAIN W. F. M. LOUGHNA N.  
*Royal Army Medical Corps.*

*Undifferentiated Fevers.*—The different types of undifferentiated fevers one meets with when serving abroad may prove of interest with a view to comparing them with the types observed by other officers stationed in various parts of the Oriental littoral, also with a view to ascertaining their various epidemiological distributions in tropical and sub-tropical climates.

The following undifferentiated types of fever are met with in Aden:—

(1) A continuous fever lasting from fourteen to twenty days, and occasionally prolonged to five or six weeks.

(2) A continuous fever lasting from a week to eight days, probably similar to the seven days' fever described by Rogers.

(3) A continuous low fever, lasting indefinitely, unassociated with any marked diagnostic points and unaccompanied by any marked debility or anæmia.

(1) The commonest type appears to be a continuous fever lasting from fourteen to twenty-one days, but sometimes prolonged for from four to six weeks. The disease occurs throughout the year; it is endemic, but epidemics have not been noted. Acclimatization does not seem to modify the disease, and it attacks Europeans and Orientals with equal severity. The onset is insidious, definite rigors rarely occur. With the advent of the disease, patients generally complain of a feeling of chilliness, or of a cold coming on, about two days before the fever appears. There is dullness of the mental system, the patient is somewhat slow in answering, and if asked to put out his tongue, he appears to do it with care and precaution; the tongue is often tremulous, even before the second day of the fever. The headache is frontal but not severe in ordinary cases. In severe cases, the hands have been noted to be shaky and the patients complain of profound backache. The eyes are somewhat staring and fixed, but there is no subconjunctival hæmorrhage or injection; an icteric tinge is common. Herpes is sometimes seen at an angle of the mouth; the tongue is somewhat enlarged, slightly moist furred centrally but not at the margins, the coating varying from a light white fur anteriorly to a dirty yellow at the back. The buccal mucous

membrane is somewhat anæmic, the palatal and pharyngeal mucous membranes are normal, or slightly hyperæmic. In a severe case with high temperatures, the oral condition closely resembles that seen in enteric fever. Bilious vomiting is sometimes seen at the onset. There is a marked tendency to constipation, which increases as the disease progresses; diarrhœa is rare, and when present is mild in character.

A mild basal bronchitis is occasionally met with, the respirations are slightly increased and a scanty mucous expectoration may be present in the early days of the fever. The pulse is slow and compressible, moderately dichrotic, and bears no relation to the height of the temperature. The blood content is unaltered during the disease; frequently a well marked secondary anæmia is present during convalescence, which is in keeping with the duration of the fever. The skin is dry, but the patient is free from all forms of rash or eruptions, except insect bites which are commonly present. The urine frequently contains a trace of albumin; it is generally high coloured, and bile salts can be readily demonstrated towards the termination of the pyrexia. The disease is uncomplicated, but towards the end of the fever or during convalescence jaundice is sometimes seen. Convalescence is generally prolonged when the fever lasts longer than four weeks; return to normal health being associated with anæmia and constipation, lasting about six weeks from defervescence.

In all the cases search was made for the malaria parasite and also for the specific microbes of enteric fever, paratyphoid fever A and B, Mediterranean fever, and relapsing fever, but with negative results in each case.

(2) The next type of fever met with varies from a week to eight days in duration, and is rarely prolonged. We believe it is similar to the seven days' fever described by Rogers.

Sudden rigors are common, associated with pains in the back and head, the pulse and temperature are in relation to each other; but after the first twenty-four hours bradycardia appears to be the rule. There is frontal headache. The conjunctivæ are not suffused, but an icteric tinge is common throughout the disease. The tongue is coated dorso-centrally with a superficial whitish fur, and the margins are red and clean. Constipation is common throughout the disease, the liver is sometimes tender and the spleen can often be felt. The pulse is slow as compared with the temperature except at the onset or on the first day of the disease, when the pulse and temperature are in co-relation. The polymorphonuclear cells are reduced, and the large and small mononuclear cells relatively increased. The face and neck are flushed during the onset and early part of the disease, but rashes have not been noticed.

The temperature charts in this type vary considerably in character. Two varieties are met with. One in which there is a continued daily fall in the temperature from the day the fever reaches its maximum until it becomes normal.

A second variety, in which the so-called saddle-back temperature may be seen, when the fever rises suddenly from 100° F. on the fifth day to 103° F. on the sixth day, followed by a fall to normal on the evening of the seventh. The pulse in this febricula save at the onset is rarely above 100, even though the temperature may rise.

The fever attacks new-comers and is commoner in Europeans than Orientals. It is chiefly prevalent in this peninsula from May to October, during which months mosquitoes and insect life are most numerous.

(3) The third type of pyrexia seen is a low continuous fever, the temperature rarely going above 101° F.; the pulse-rate is generally unaltered, and respiration normal. The patients are sometimes unaware they are suffering from fever. The duration of this pyrexia cannot be defined, but it is invariably prolonged, dyspeptic symptoms, slight emaciation and anæmia accompanying the disease.

*Sand-fly* fever has been described by one of us in a paper published in the ROYAL ARMY MEDICAL CORPS JOURNAL for October, 1913. The other, having come from a station in Northern India where sand-fly fever is very prevalent from May to October, has noted some differences between the type met with in Aden and that of the North-west Frontier Provinces. The Aden type is much milder, at any rate in the so-called cold weather. The temperature is about the same, between 102° and 103° F. The symptoms, however, are not nearly so exaggerated. Headache is slighter, the conjunctivæ are not so intensely congested, and the pains in the back and limbs nothing like so racking. In one respect it is more severe in Aden, that is in the large number of cases presenting gastro-intestinal symptoms. The nervous cases which occurred fairly frequently in Nowshera appear to be absent, and the cases of recrudescence which were seen occasionally after the patient was apparently convalescent, are entirely absent here.

Relapses occurring within ten days of discharge, and second and third attacks occurring a month or so after recovery were by no means infrequent in Nowshera, but here appear to be non-existent.

The slow pulse and the leucopenia are the same in both, and the duration of fever practically alike, but the men return to duty sooner in Aden even allowing for the enervating effects of the climate. They, as a rule, are fit for work in eight days, a clear gain of two days over the most severe type. These variations in the symptoms may be due to the difference in temperature and moisture, or perhaps may be related to the species of sand-fly caught in each place.

In Aden, *P. minutus* is practically the only fly caught in any numbers.

In Nowshera, on the other hand, *P. papatacii* is practically the only one of any importance, though the others, *babu*, *minutus*, and *sylvestris*, have all been caught in Nowshera and identified at Pusa.

The habits of these vary. *P. minutus* is so small that it is difficult to see, and the bite does not irritate much; it only attacks in the evening

and night time. The Nowshera variety on the other hand, is fairly easy to see on walls and on mosquito curtains, and is comparatively easy to catch. I have caught hundreds in my bungalow in test tubes. It bites with equal relish night and day, and as far as I could judge both males and females impartially feed on one. The bite is extremely irritating, quite sufficient to wake one up. Protection by the way can easily be obtained by using ordinary mul-mul for curtains through which neither mosquito nor sand-fly can pass.

*Enteric Fever, etc.*—Enteric fever and its allies are very infrequent amongst the British troops and not endemic. A certain number of cases are found in Europeans who are passing through, they are treated at the European general hospital. Amongst the natives cases have also been known. The cases of enteric fever occasionally found amongst soldiers are probably caused by infected flies and dust.

*Malaria* is non-existent among the troops except relapses in cases infected elsewhere. There are no anopheles nearer than Shaikh-Othman ten miles away, but *Culex fatigans* and *Stegomyia fasciata* can be found in small numbers all the year round chiefly breeding in shallow brackish wells.

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## MARCHING ORDER EQUIPMENT FOR THE MEN OF THE ROYAL ARMY MEDICAL CORPS.

BY CAPTAIN K. H. REED.

*Royal Army Medical Corps.*

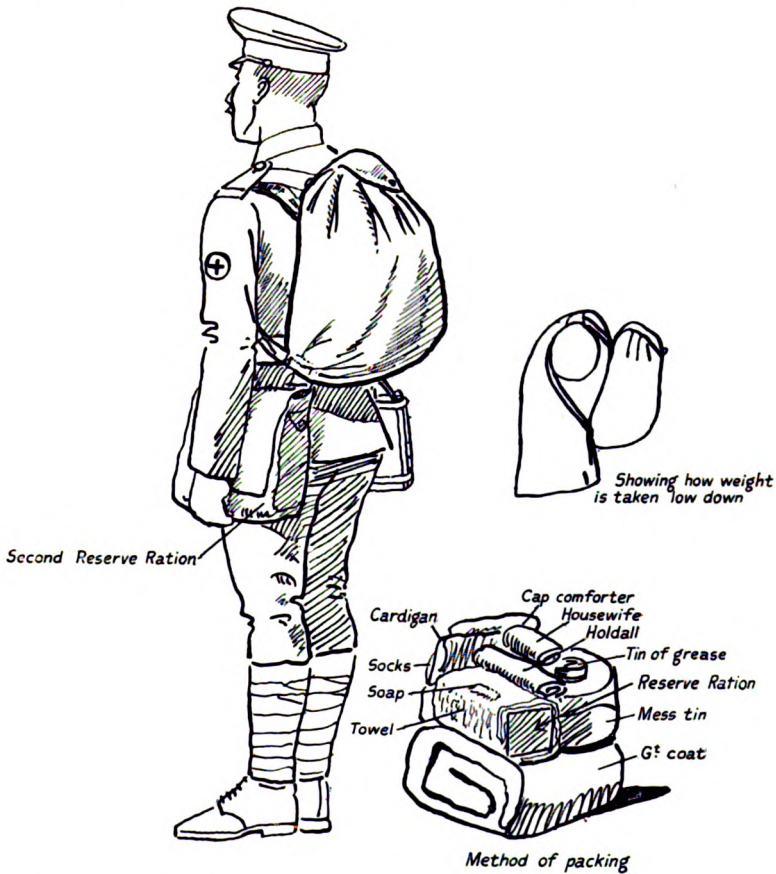
THE question of adopting a suitable marching order equipment for the Royal Army Medical Corps has, I believe, been under consideration for some time and several experiments have been made with modifications of existing patterns.

The equipments tried, however, all suffer from certain disadvantages, the chief being that they are difficult to adjust, offer no protection to the great-coat, and are not suitable for carrying all the kit which is laid down for service. I would suggest a form of rucksack used in the Gurkha battalions of the Indian army which appears to meet most requirements (see figure on page 707). It is capable of holding all the kit laid down in the Field Service Manual, Army Medical Service, does not depend on ammunition as a counterpoise (as most of the weight is taken on the lumbar region), can be easily adjusted and easily put on and taken off, and has no straps crossing the chest. As is well known, a properly adjusted rucksack is an excellent method of carrying kit and is used extensively by the Swiss and Tyrolese guides. It has also been adopted by several European armies. The rucksack is particularly suitable for our men as it is easily put on and taken off and no counter-weight is necessary to balance it.

All the field kit can be carried in it, leaving the haversack available for



food and various small articles, including a second reserve ration if considered necessary. Worn in conjunction with the belt, braces, haversack, and water-bottle of the Mills-Burrows web equipment, with perhaps, the substitution of a couple of pockets to carry dressings in place of the ammunition pockets, it would, in my opinion, form an almost ideal equipment for the Royal Army Medical Corps. Even if the present equipment were still used the rucksack would be a very considerable



advance on our present marching-order kit which, although better than that worn a few years ago, is very unsatisfactory, and seriously handicaps the men when on the march, as the coat presses on the chest and the haversack packed tight with kit chafes the leg; there is also no room for the second reserve ration.

The rucksack illustrated, which was kindly lent to me for experiment from the Royal Army Medical College, is made of haversack canvas, and

costs only a few pence. A better article could easily be made of Willesden canvas or web, the braces being fitted with leather straps and buckles at the lower ends; it would also give better protection.

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#### A CYCLE AMBULANCE TROLLY.

BY LIEUTENANT-COLONEL P. C. GABBETT.

*Indian Medical Service (Retired pay).*

THE problem of how to improvise transport for the carriage of sick and wounded has always been an interesting one. No real use has yet been made of the bicycle, and still it presents many obvious advantages. It is obtainable everywhere; it is cheap, light, and rubber-tyred. We seem to have ready to our hand the two halves of that most comfortable

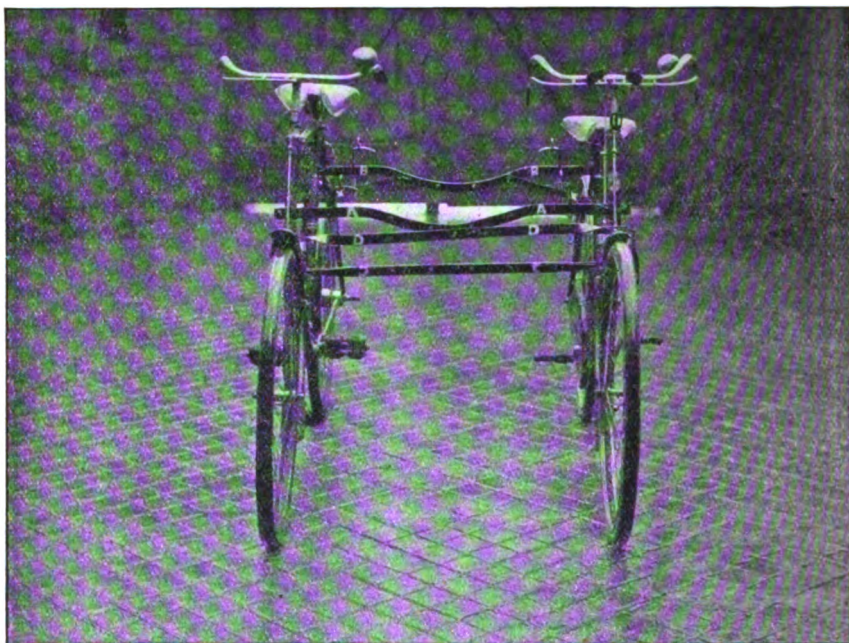


FIG. 1.

form of transport, the rubber-tyred ambulance trolley; all that is wanted is a method of rigidly connecting the two halves so as to provide a weight-bearing frame, and to co-ordinate the steering. The apparatus for doing this must be cheap, simple, portable, and capable of being quickly put together. If such an improvised trolley is capable of being



ridden by two bearers carrying quickly to the side of the patient a stretcher and any other necessary equipment, and if when carrying a loaded stretcher it can either be easily drawn by one man or attached behind a cart or even a motor, then such an apparatus ought surely to find a place in the equipment of every voluntary aid detachment, even if no room can be found for it in the equipment of the Army and Territorial Force.

I will describe an apparatus which, so far as I have tested it, appears to fulfil the necessary conditions, although it has yet to be put to the only real test, that of actual use under service conditions. I have neither

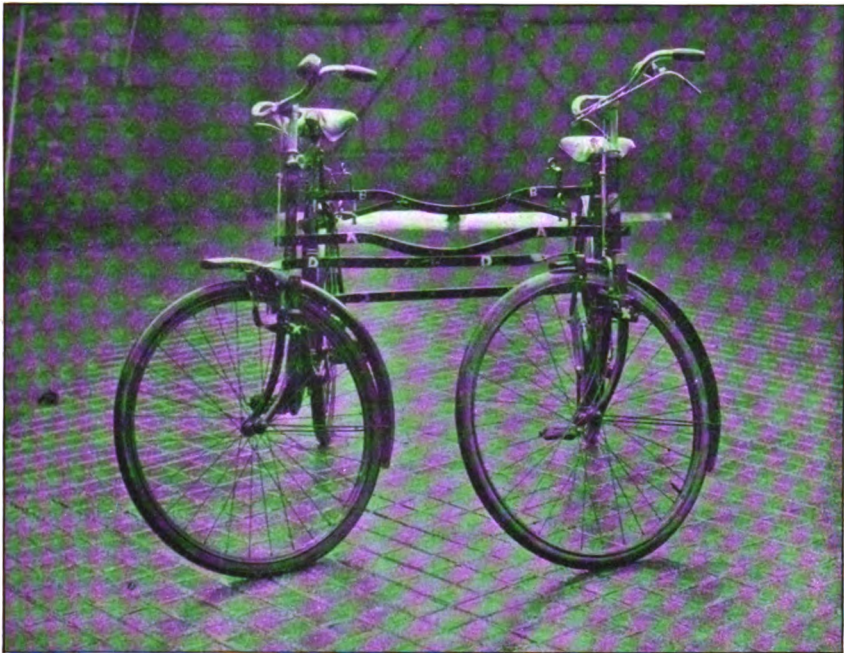


FIG. 2.

the time nor the opportunity for so testing it, but I shall be pleased to send it to anyone who is sufficiently interested to put it to a thorough trial.

The connecting bars are three in number (*see* figs. 1 and 2). Bar A is first clamped to the head-tube about an inch above the bottom lug (junction of head-tube with bracket-tube). Bar B is next fitted to the seat tube at a point level with bar A. The cycles are now brought together and the other ends of the bars fitted in position, having the

front wheels as much in line as possible. It will be noticed in the photographs that bar B is fitted with short stays which should be clipped as low down the seat-tubes as their length will permit. Bar C is next fitted to the highest convenient point on the bracket-tubes; its function is only to take the strain of driving and braking. The stretcher (fig. 3) rests on bars A and B, which are concave, so that no pressure from their edges shall be felt through the canvas. On these two bars, at a distance corresponding to the width of the stretcher, are fitted four spring clips. These grip the poles of the stretcher and prevent it from

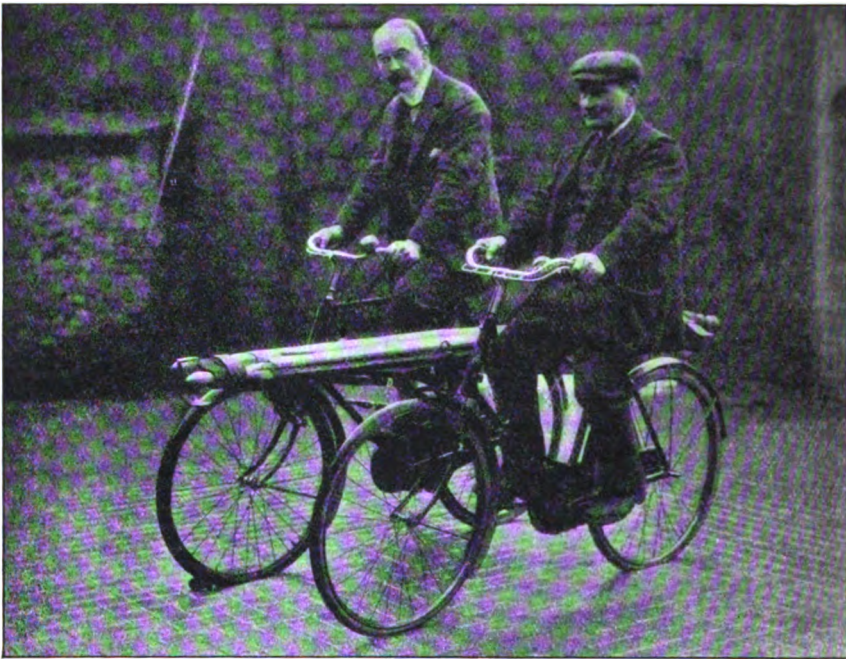


FIG. 3.

tilting or shifting. The steering bar, D, has a sliding adjustment for length, and is fitted with two jointed and curved arms which clamp on to the left hand forks of each cycle, that is to say, to the inner fork of one cycle and to the outer fork of the other cycle. The points of attachment to the forks is marked by X in fig. 2. All the clamping is done by wing-nuts so that no spanner is required. Either a lady's or a man's cycle can be used. In the photographs a lady's cycle is used on one side and a man's cycle on the other.

When it is desired to place the loaded stretcher on the cycle trolley



(fig. 2), the front wheels should be turned at right angles as far as they will go, the stretcher is then lifted sideways over the handle-bars, lowered into position, and the spring clamps adjusted.

When the cycles are being ridden a closed stretcher can be carried. It is possible to ride the united cycles at a good pace, but the steering requires a few minutes' practice, just as does the steering of a tricycle or a side-car. When a loaded stretcher is being carried, one man can easily push and guide the cycle trolley, while grasping it by one pair of handles.

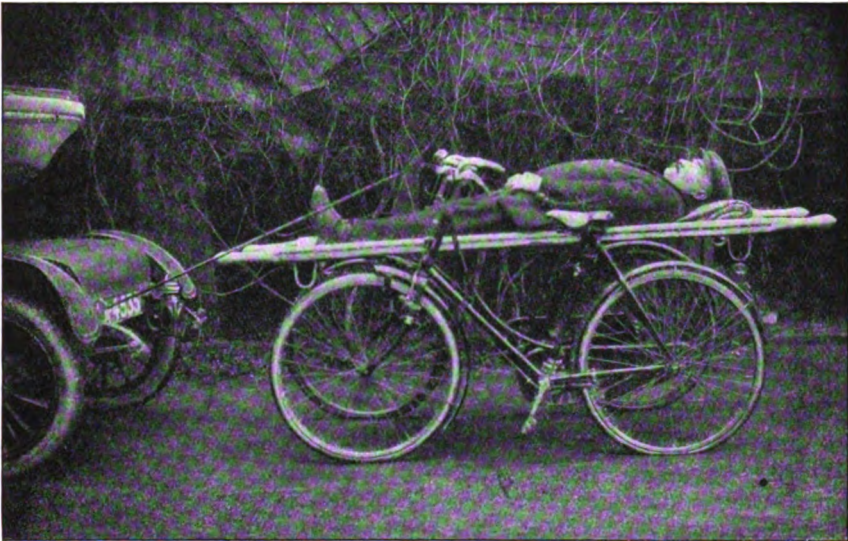


FIG. 4.

I have also tested a tow-rod clamped to the handle-bars of one cycle. By means of this rod the cycle trolley can be pulled by hand or attached to the back of a cart or motor-car, steering automatically (fig. 4). I have tested the trolley carrying a loaded stretcher up to ten miles an hour, and see no reason why it should not be possible by means of a little longer traction rod, to couple up two or three cycle trollies, one behind the other, and so make a road train which could be attached behind any vehicle.

The weight (exclusive of traction rod) is not excessive, and the apparatus can be obtained from or seen at the works of the Minto Cycle Coupling Company, Vange, Essex.

## AN UNUSUAL ACCIDENT.

BY LIEUTENANT T. O. THOMPSON.

*Royal Army Medical Corps (Special Reserve).*

ON January 28, A. D., aged 34, fell off a haystack on to the handle of a hayfork, which was broken, and he was then thrown heavily on to the ground, falling chiefly on the right side. The hayfork entered and caused a wound three inches long in his scrotum, piercing the trouser; apparently only skin and dartos were torn, although the testicle tended to protrude. (No definite history was obtainable.) The patient complained of pain in the right side, but no lesion or bruise could be found anywhere on the side, arm, or axilla. No ribs appeared to be broken. Under an anæsthetic the scrotal wound was sewn up. On January 30, the pain on the right side over the liver and lower lobe of the lung was not so great. On January 31, the pain was situated about the right nipple, and was felt on coughing and breathing. A friction rub was heard, but there was no dullness on percussion, and no impairment of breath sounds. The right arm was immovable on February 3, and there was pain on breathing and on pressure over the chest. There seemed to be a fluid-filled cavity beneath the pectoralis major, beginning to point one and a half inches below the nipple, limited by the origin of the pectoralis major. This was opened and proved to be an abscess cavity with purulent blood effusion, which was drained by a tube through two openings. During the initial tension of the muscles the subpectoral fluid was seen to shoot down through the origin of the pectoralis under the skin of the abdominal wall. Two pieces of straw six inches and three inches long were found in the abscess cavity; no others could be felt. The cavity drained well and the patient's condition was improved on February 5; but another abscess had formed subcutaneously in the abdominal wall, in line between the right pectoralis and the scrotum. This was incised, evacuated, and drained; no obvious connexion with the scrotal wound was found. He became worse on February 7, when the whole of the anterior chest wall was œdematous with a red area internal to the right nipple. This was incised freely under gas but no pus was found, and the patient became much worse. Two pieces of hay, one and a-half inches and four inches long were found in the abdominal and pectoral incisions respectively of the previous operations. Broncho-pneumonia developed.

The post-mortem examination showed a complete subcutaneous track from the wound in the right side of the scrotum to the infraclavicular region, terminating at the second right rib, which was broken and showed osteomyelitis. The whole track showed putrefaction, and the cavity under the pectoralis was in a similar state. Buried in one corner of this cavity were found a piece of tweed cloth (from the trouser) and some hay and straw. The spleen was almost fluid, the heart pale and flabby. The right lung showed pleurisy and œdema of the lower lobe; the left, which had three lobes, showed pleurisy and early broncho-pneumonia.



This case appears to be quite unusual, in that the sharp broken handle of the hayfork passed subcutaneously from the scrotum, over the pubes, into the tissues of the abdominal wall, travelled upwards externally to the ribs, and finally piercing the origin of the pectoralis major reached and stopped at the second rib, where it deposited some hay and a piece of the man's trouser. The height of the fall was only seven feet. The man must have doubled himself up when the handle entered, thus allowing the point to pass superficially to the ribs and causing it to come up against the second rib. Evidence at the inquest showed that a fellow workman pulled some two feet of handle from the man, who then walked home three miles and drove ten more to hospital.

Presumably the proper treatment would have been to lay the whole track open, but no evidence was obtained that there was a long subcutaneous lesion until the abscesses developed.

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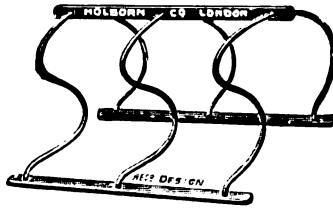
### A LEG CRADLE.

BY LIEUTENANT B. RICHARDSON BILLINGS.

*2nd Home Counties Field Ambulance; Royal Army Medical Corps,  
Territorial Force.*

As the result of practical experience, I have designed a leg cradle, modified from the ordinary pattern, as the illustration will show.

The hoops on one side are made concave in the lower part of their



ordinary convexity, this hollowing-out allowing the uninjured leg to lie comfortably parallel alongside its fellow, and not in a splayed-out position, as is the case with the ordinary patterns.

Without any prompting the patients on whom I have tried it, after using the old sort, testify as to its superiority on the score of comfort; while the price is no more than that of the ordinary pattern.

## Lecture.

### A LECTURE ON BILLETING.<sup>1</sup>

BY MAJOR G. T. K. MAURICE.

*Royal Army Medical Corps.*

THE subject of billeting is threefold. There is billeting in peace, there is billeting in war, and there is a billeting scheme for the Territorials should it be necessary to mobilize them. I shall not touch again on this last part of the subject; it does not concern us to-night.

If any one here is curious about etymology, he will find the history of the word "billet" interesting. The word is derived from the Latin "bulla," later "billa," a knob, anything rounded by art. It was applied to old-time leaden seals on account of their shape, and hence came the word "bull," an edict of the Pope—the term for the seal on the document being applied to the document itself—and from thence a bull or a bill came to be applied to a variety of sealed papers, and after a while to papers of certain sorts not sealed at all. The English language kept the word to signify the many various things, accounts of money, drafts of laws, placards, and so forth that we know as bills, but adopted a French diminutive of similar origin, and anglicized the pronunciation of it for a word to express the lodging assigned to a soldier, or the act of quartering soldiers on persons compulsorily, according to the part of speech. A billeting order was originally a sealed paper. Though, as I have said, of the same origin, the French word "billet" is not used to imply a quarter or lodging, but the paper ordering persons to receive soldiers is "billet de logement." The French have, however, a verb "billetter," to billet, which they have taken and adopted from English usage. We seem to have borrowed their "billet," and called it "billet"; they have returned the compliment by taking our "to billet," translating it by "billetter" and transferring it to their own language. The word "bullet" is from the same root, and there is "bull's eye," a kind of sweet, flavoured with peppermint usually, that is really a diminution of "bull bullery," a small rounded knob, the last relic of the oldest use handed down through generations of children.

That little sealed paper ordering householders to receive soldiers into their houses has made much history. So far as I understand the matter, it never has been legal to quarter soldiers upon private persons, nor was it legal even to quarter them in public houses till the Revolution of 1688. The right to do this was given when William III. was king. Kings before his time had usurped power to order their subjects to accept the quartering of soldiers upon them, and some kings ingeniously saved pension charges by the device of quartering disabled soldiers, and time-expired soldiers

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<sup>1</sup> Read at the Military Hospital, Tidworth, March, 1913.

returned from the wars who could not find work, on various sorts of persons. Naturally the old soldier with free food and lodging provided in a private house did not go tramping the country seeking employment. The soldier was satisfied, the king was satisfied; the only people dissatisfied were those members of the public who had to find the free quarters.

As a matter of fact the Stuart kings had no choice but to billet their soldiers, because there were no barracks in those days. Aldershot was not born, nor Tidworth thought of. It is true those same kings had no right to keep a standing army. Their people used to retort this upon them. But a standing army was the sort of thing to justify itself and what its king did. That was why the people hated it. And at the bottom of her heart England still hates and fears a standing army so much that the Army exists only from year to year. Any year it may cease to exist if a sufficient number of members can be counted in the division lobbies against the re-enactment of the Army Act. Meanwhile, in times of peace, under certain conditions, this Army may exist, and may be quartered in England, Scotland, and Ireland, in "inns, livery stables, ale-houses, victualling houses, and all houses selling brandy, strong waters, cyder, or metheglin by retail to be drunk in their houses." "And in noe private houses whatsoever." I have no personal experience of metheglin; I do not think it is often drunk by the British soldier. It is, I believe, a fermented liquor made of honey. A gouty tipple, I should fancy, but George Borrow, in his account of the bee-minder in Romany Rye, describes it as most delicious. He describes it as "a brown-coloured liquor"; potent, too; "deliciously sweet and mellow, but appeared strong as brandy; my eyes reeled in my head, and my brain became slightly dizzy." But, excepting in Romany Rye and in the Army Act, I do not remember other mention of this liquor. The abuse of the power of billeting, in all times, was restrained by the fact that the allotment of billets always rested with the civil authorities of the town or village in which soldiers were to be quartered. They, having local knowledge, and being naturally wishful to stand well with their fellow townsmen, made arrangements as little obnoxious as possible. Apparently, the civil authorities at times did use their powers to annoy persons with whom they had private quarrels, for in the reign of William III, when billeting was first made legal, oppressive billeting by the civil authorities was further checked by a clause in the Act holding the civil authorities liable to pay pecuniary damages to any persons wronged by the improper quartering of soldiers upon them.

The power to allot billets is still in the hands of the civil authorities, and it is especially laid down in the Army Act that "a person having or executing any military office or commission in any part of the United Kingdom shall not be directly or indirectly concerned in appointing quarters. And that all warrants, Acts, and things made, done or appointed

by such person shall be void." The general officer commanding-in-chief, Southern Command, cannot order any person to provide a billet. The village constable can.

The procedure is as follows: Troops are to move through England, and to be billeted on their way. They are moved on the authority of a route which is signed by the Secretary of State for War, under the authority of His Majesty the King. On this document it is stated through what places the troops will move. This route must be produced, and a demand for billets made to the constable in charge, and he must then find the billets. If a document purporting to be a properly signed route is produced by an officer or soldier to a constable, he must act on it. That it purports to be a legal route is enough; he cannot question it. He must act until he has evidence that it is a forgery, or otherwise illegal. This provision is to prevent delays on pretence of doubt as to the legality of the document. It prevents a town unfriendly to the military keeping a regiment standing in the streets all night whilst it takes advice as to the legality of the demand for billets. There are, of course, heavy penalties for offences such as forging routes or illegally demanding quarters.

But peace billeting is a simple matter. It only means that the keepers of public-houses have to provide reasonable accommodation at a very cheap rate to soldiers on duty. The exact scale of charges is laid down in an appendix to the Army Act.

It is in time of war that billeting becomes interesting. When an army is marching through an enemy's country there is no law for it but martial law. The civil authorities of the enemy's country will provide billets if they are afraid of what the invading force may do to them if they do not provide them. If therefore the local civil authorities refuse to take steps to provide billets, the general officer commanding will take steps to make them do so. In practice the chance of being shot off-hand if they play the fool will make the local authorities civil on receipt of Army Form F. 788. A copy of this form is in Field Service Regulations, Part I. It says "As an Officer in the British Army, I, acting under powers conferred on me, hereby direct the Local Authorities of [such and such a place] to supply billets for:—" Here ensues a space for details of numbers and of the number of meals if subsistence is required. It goes on to say that in the event of subsistence being demanded and required, the question of payment will be considered at the nearest British garrison. It does not say payment will be made.

The billeting demand goes on with a veiled threat or a broad hint to the inhabitants, for it orders the local authorities to apply to the undersigned without loss of time in case of any disobedience on the part of the inhabitants, so that military force may be applied if necessary. There is no "hesitation" about that Army Form. The tenor is—find board and lodging for so many officers, men, and horses, or we will make you! At the same time a supply of Army Forms F. 789, billeting orders

on inhabitants, is given to the head of the community, and he has to make one out to each inhabitant. This is a council of perfection; of course it could not always be carried out for want of time.

These demands for billets can be made either with subsistence or without subsistence. The subsistence can be paid for in cash or by requisition. Usually, no doubt, subsistence would be demanded with the billets because the more the army can live on the country, the less become the difficulties of transport. And as a rule such supplies will be paid for, not out of good-will but from principles of policy. The inhabitants of the enemy's country are more likely to reveal the existence of supplies if they get cash for them, than if they only have the pleasure of seeing the invading army eat them. Though it is not necessary always to pay for supplies in an enemy's country, one has to be a little careful about miscellaneous and unauthorized appropriations, because there are sections of the Army Act that make it uncomfortable for you if you are found out.

I have told you that a billeting demand is made on the civil authorities, and a billeting order is passed on by them to the inhabitants. But this is only half way through the proceeding. I must go back to the beginning. The regulations for billeting are all common sense. If any one of you should be told to march a party of men to London from Tidworth, what would you do if you had no regulations to guide you? You would find out, as far as you could, what places there were at convenient day's marches apart to billet in, how far you would be able to trust to local supplies; if there were any special reason for avoiding any particular place; and, if you were liable to be attacked on the way, how best at each place to meet attack. When you got near a place you would send on someone to tell the inhabitants to make ready for your party, and that someone would make arrangements, find out the geography of the place, come back to guide you in and show you to your quarters. And that is what the staff work in billeting an army comes to. And the rules and the regulations—are they not written in the books of the Field Service Regulations? I do not propose to read you extracts from Part I.

Our special duty would be to give expert advice on the sanitation of the billets. Obviously in an enemy's country it would often not be possible to go thoroughly into the sanitary condition of the town or village in which a force was billeted. The head of the community would be asked as to the presence of any infectious disease in the town, and infected houses would be avoided. If after occupation of a house it was found that infected inhabitants were in it, it would be necessary to take steps to avoid the spread of the infection throughout the army. No rules can be laid down. The only good rule is "use your brains." Say ten men are found to be billeted in a house that has half a dozen children peeling after scarlet fever. Some of these men are very likely to have been

infected. They will not show the disease for a few days. I should report the circumstance to the commanding officer of the regiment and arrange for these ten men to march apart from the others as much as possible, and that they should be associated in future billets and not allowed to share billets with other men. Then if any developed the disease they could be drafted out and put in hospital.

The giving of expert advice is but a part of our work. Our duties in connexion with billets are manifold and complex. We are doctors, medical officers of health, commanding officers of men, organizers of hospitals. Some of us will be doing one duty, some another, some all four at once. I shall not ask you to listen to me as I read out to you tables of the duties of a medical officer in every possible situation. I propose only to give a few hints. The medical officer's first duty will be to use his common sense. Use your hand and your horse. Get around and look at things. Say you are attached to a regiment:—Get around and find a good place for your inspection room and detention room. Very likely it is a good place for something else. Never mind, go to the commanding officer or the adjutant or both and point out the necessity of a central place for the seeing of the sick. Use tact to get your way. Imply that there is a regulation to the effect that after tactical considerations the care of the sick should have the first place. I do not say there is such a regulation. Nor should you; but use a little tact and you will get your way. Possession is nine-tenths of the law; so, as soon as you have got your way, occupy the place. Chalk a notice on the doors. Install an orderly to take charge and get a sick man or two well wrapped up in blankets into it. This will help to prevent other tactful persons ousting you from the desirable spot you have acquired and sending you on to settle elsewhere. Then go round the billets of the men of the regiment. Inspect them intelligently. See there is enough latrine accommodation. Take a look at the water supplies. As you move about amongst them cast your eyes over the men and make a note of any that look ill or knocked up. Arrange to examine them more fully later if you think it necessary. If you see a man going lame stop him, have his boots off and see what is the matter at once. Soldiers are often very stupid about rubbed feet. Do not forget yourself; you must also keep yourself fit as well as the men, so find out where and at what time you are to have your food. If you leave that to chance you may go hungry.

If you are commanding a field ambulance you will have to select a good place at which to establish a temporary hospital unless the assistant director of medical services has definitely named a spot to you. Some sick are sure to come in to your field ambulance. The medical officers with regiments will not keep anyone who cannot march if they can help it, but will pass them on if possible to a field ambulance. As the field ambulance will be moving on with the division to which it is attached, any sick soldiers who will not be fit for duty after a day's rest



in an ambulance wagon must be left behind. The assistant director of medical services probably will have given instructions, but if he has not, make arrangements and ask him to approve them.

In our official books there is much written on our duties with regard to the wounded after a battle. I have had much practice in that side of work, because it has been my fate many times to be just behind the fighting line in sanguinary battles with a horribly large proportion of wounded to troops engaged in the staff tours I have attended. But our duties with regard to the sick sent to a field ambulance on the line of march or in billets are much less defined. This is probably because the conditions must be so various. Suppose a field ambulance to be marching, day after day, for six days, fifteen miles each day, and billeting each night. What will it do each day with its sick? Obviously this question can only be answered each day after consideration of the conditions. Presumably a battle is imminent, or the troops would not be moving so rapidly; one would not desire, therefore, to detach any part of a field ambulance at any time for fear it should not catch up again. If I had no other orders I should consider the circumstances in which I was placed each day and act accordingly. If a railway station were available within short distance I should send my sick there perhaps; but my ambulance wagons have to go fifteen miles each day, so they should not go more than two or three miles out and back if I could help it. Supply wagons would take all or some for me back to some stationary hospital perhaps. Another day I might find it best to leave the sick collected in some house for a medical unit following behind me to take over. In fact the disposal of his sick will be a daily problem for the officer commanding a field ambulance. The chief points to bear in mind would be: Keep your field ambulance together; get on forward with your unit; send your sick back down the line; make quite certain that you have so arranged that the sick shall not be forgotten or left unattended, and let the assistant director of medical services know each day where any sick you have disposed of have gone. As commanding officers, medical officers will have men of our corps and men of other corps, attached, to command and to provide for. This will entail duties similar to those performed by regimental officers. You will have to send forward a billeting party just as a regiment does to take over your billets. Be careful to see that your allotted billets are all close together and not mixed up with the billets of other units. A certain amount of adjustment of billets after allotment is permissible. For instance if your billets are all down one side of a street and the billets of another unit are all down the other side you and the officer commanding the other unit may arrange so that you have both sides of half the street and he both sides of the other half. Keep your men all together if it is possible. Then you may have the horses of a field ambulance to provide for. Keep them together also if you can. But if you cannot, mind you know

exactly where they are so that you can find them instantly at need. I know from experience on manœuvres that it is "the very deuce" on a dark night if you are suddenly ordered to move on your field ambulance and cannot find the places where your horses are.

Find out who is on each side of you, and find out the ways in and out of wherever you may be. It is quite likely that you may not be able to take your wagons and carts to your billeting area. In fact it is probable that will be the case. If you have a dozen houses of sorts allotted to you for your billets and for your arrangements for tending the sick they may be in the middle of a town of small streets. You may not block those streets with ambulance wagons and general service wagons. Your transport will be parked outside the town, probably in a field near the road you will take next day. Perhaps quite a long walk from your billets. You must not forget to tell off a guard for those wagons, and be absolutely certain that you yourself and many of those under you can find those wagons again in daylight and in the dark.

The officer commanding a field ambulance must appoint an orderly officer to go round the men's billets and inspect them at least once by day and once by night. This is to make sure that your men are as well fed and as comfortable as it is possible for them to be, and also to see that they are behaving themselves. I put food and comfort first as our men are very well behaved as a rule, and I wish to emphasize the great importance of food and comfort in keeping men fit under strain.

In every billeted house a man must be put on duty to guard all equipment in that house, or you may find the inhabitants have made free of some of your men's belongings, for each house will have its own proper inhabitants in a portion of it.

The only accommodation you are entitled to expect in a billet is a room in which to shelter, and subsistence if subsistence is requisitioned. Anything else is obtained by good luck or good management. You must not take the private property of the inhabitants. That is prohibited by the laws and customs of war, and also by the Army Act. So beds, blankets, and so forth, the property of the people in whose houses you are billeted may not be taken. This does not prevent the general officer commanding an army requisitioning on the head of the community for anything he likes to ask for for the use of his troops. He may do what he chooses, but will of course have to defend his measures to his Government. But you personally cannot demand things as a right, and you may not demand things with threats. However if you are tactful you may get a good deal. To begin with the inhabitants very likely are not up in the rules and customs of war. If you ask kindly for a bed no one can blame you, and if the inhabitants provide it not knowing they need not, that is no fault of yours; this applies also to fuel and cooking pots. It is wisdom to ingratiate yourselves with the inhabitants. By the exercise of a little tact probably you will be able to get a good deal out of the most

unfriendly inhabitants for yourself and for the men under you. It will be always worth trying it on anyhow. As a last resource you can offer to pay for things and services if you have any money. In an enemy's country, however, I should never like to part with any of my hard-earned pay to the advantage of my country's foes, and in a friendly land I should not like to deprive our friends of chances to perform the duties of hospitality, nor of opportunities to show their gratitude to the soldiery.

Though you are justified, in my opinion, in getting all you can out of the inhabitants of the enemy's country for the benefit of your command for as little cash as possible, you are bound to maintain strict discipline over your men, and to see that the inhabitants are protected from wrongs. Drunkenness, plundering, and offences against females are the most likely crimes. Do not hesitate to deal with them. Have no mercy on active service. It is of the utmost importance in an enemy's country to keep on as good terms as possible with the inhabitants, and therefore the Army Act prescribes heavy penalties, even death, for wrong done to private persons. It is subversive of all discipline and ruinous to efficiency to allow your men to loot, or to go consorting with the women of the country. The reins of discipline must be tightened, not relaxed, in billets in an unfriendly country.

Billeting will be close or open according to the accommodation, and according to the nearness of the enemy. Obviously, if a commander knows that he cannot be attacked for the next three days and accommodation is available he will give his men as much space as possible because it is more comfortable and more healthy. But if the enemy is close at hand and attack may come at any moment he will billet his men as closely as possible so that he may get them all together, and into position as rapidly as possible. Usually very close billeting will only be for a night or two at a time. It will be right for you to see that the ventilation of such close billets is as good as it is possible to make it. So see to that, and do all you can to keep the air fresh; but do not write to superior authority in such circumstances and point out that each man should have 600 cubic feet of space in which to sleep.

I have told you to find the ways to and from your billets to the road of march. Also remember to find out where the headquarters of the brigades and of the division are, and how to get to them. Get the address of the assistant director of medical services. But he cannot be always in his quarters, since he will have a good many miles of billets to supervise. He cannot, therefore, be always telling you what to do. Do, therefore, what you think you ought to do, or what you think it is best to do, and tell him where you are and what you have done when you can. Take responsibility, and if necessary take the blame. I imagine the man who does something not quite the best is less exasperating than the man who does nothing because he could not find anybody to tell him what to do.

## Travel.

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### CEYLON AS A MILITARY STATION.

BY MAJOR E. P. SEWELL.

*Royal Army Medical Corps.*

To the traveller the word Ceylon calls up memories of a glorious break in the monotony of a long sea voyage, of a palm-fringed shore washed by the bluest of blue seas, of red roads winding beneath the shade of beautiful green forest trees among which here and there a blaze of scarlet marks the position of a flamboyant tree in flower, of cool-looking bungalows set well back in flower-filled gardens, and of a warm, langourous atmosphere, inspiring a feeling of indolent content, which makes anything approaching bustle appear an act of vandalism. Such is Ceylon to the traveller; and it is only natural that when he leaves the island after a visit of a few days he takes with him only a superficial idea of its advantages and disadvantages as a place of residence, and is apt to give misleading advice.

As four of our officers are stationed in Ceylon it may be helpful to set down the impressions one has formed after serving the greater part of a three-year tour there. It is somewhat difficult to write with an unbiased pen, as feelings on the desirability or otherwise of Ceylon as a station are apt to run high. Some officers profess to like it immensely, while others, the majority I think, dislike it fervently. Let the facts speak, and let the reader decide in which class he would place himself.

*Garrison.*—The garrison consists of a regiment of Indian infantry, a company each of Royal Garrison Artillery, Royal Engineers and Royal Army Medical Corps, Army Service Corps, and Army Ordnance Department details, the whole British garrison numbering only 320 of all ranks.

The four officers R.A.M.C. are distributed as follows: One lieutenant-colonel, who is senior medical officer and officer commanding R.A.M.C.; one major, who does duty with the troops in Colombo and generally goes up to camp with them at Diyatalawa, and who is also the sanitary officer; and two other officers, who have the rank of major, captain, or lieutenant. These two take it in turn to be in charge of the convalescent depot at Nuwara Eliya, and so spend half their tour in the hill station. The only stations now occupied by British troops are Colombo, Nuwara

Eliya, and Diyatalawa, while there is a company of Indian troops at Kandy.

Colombo is the chief place of interest, as all the troops are stationed there except during two or three months of each year, when they take it in turn to go to Nuwara Eliya and Diyatalawa for musketry and field training. Colombo is a very large and pretentious town covering an area about eight miles long by two miles broad. Distances are great. From the officers' quarters in the fort to the tennis clubs and the district in which most of their friends live is a distance of from two to three miles, and the golf club is over four miles away. The method of locomotion is therefore an important question. Horses are very dear, and a sound horse is not easy to find in Ceylon. Traps are also dear and are seldom seen, as nearly everyone runs a car or a motor-bicycle. Rickshaws are too slow for these days of hurry and rush.

*Houses and Quarters.*—The R.A.M.C. are fortunate in having quarters allotted sufficient for all. The quarters are well situated and get the full benefit of the sea breeze, but their internal arrangements are inconvenient and ill-designed. Poor as they are, however, the Corps is counted lucky to have them, as the married officer, who is allotted one room in Bachelor Row, is in a sorry plight. Bungalows cost anything from Rs. 200 a month upwards, and are hard to get at any price, and the only alternative is to live in one of the hotels at prohibitive rates, or to go into a boarding-house where everything from the food to the society is of a second-rate order.

*Society.*—Colombo being a very large commercial town, and the garrison being so small, it is not surprising that the latter takes a very unimportant position in the society of the place. The unostentatious friendliness which makes Indian life so pleasant is conspicuous by its absence in Ceylon, where large dinner parties and balls are the only method of entertaining. The individual officer with his limited income and inconvenient quarters can do little by way of a return, and collectively it has never been found possible to do more than give an "At Home" at the races once a year. Those who care for dancing can get as much of it as they want, as, besides private and subscription dances at intervals, there is a dance every Saturday and sometimes also on Thursday at the Galle Face Hotel, and one a week at the G. O. Hotel. These dances are open to all comers and are largely frequented by Colombo society. There are two clubs at which tennis, croquet, bowls, and bridge can be indulged in. The Garden Club is, *par*

*excellence*, the tennis club. It possesses twenty-two good courts, and everyone keen on tennis joins it. Prince's Club has only three courts, and on week-days is almost deserted. On Sundays and race days, however, it is the fashionable resort. A band plays there every Sunday evening, and all the world and his wife go in their best clothes and gossip with their friends. Other games played in Colombo are cricket, rugger, soccer, hockey, and golf. The golf links are fairly good. There are eighteen holes presenting a certain amount of variety, and the greens are well kept, and made of good turf.

*Climate.*—The climate of Colombo is by no means unendurable. Perhaps the greatest drawback is that there is little variation in the temperature all the year round. There is no bracing cold weather to look forward to. The maximum shade temperature usually is between 80° and 90° F., while the minimum seldom, if ever, falls below 70° F. The mean temperature varies only between 79° and 82·5° F. There is very little variation either diurnal or annual, and one's feelings depend rather on the humidity of the air, and the presence or absence of wind, than on the actual temperature. The humidity is always high, and often is little short of saturation, a condition which gives rise to far more discomfort than a higher temperature which is at the same time drier. While there is plenty of wind one remains fairly comfortable, but during the windless months the damp heat is decidedly oppressive.

Colombo gets two monsoons. The south-west begins in May and continues until September. During this time the air is fairly cool and frequent showers keep the dust laid and make everything fresh and green. In October, the north-east monsoon is ushered in with heavy rain, which may continue off and on until the end of the year. At this time it is usual to get heavy rain every afternoon, which spoils all games, and gives the new arrivals by the troopship a bad impression of the country. January, February, and March are usually fine. The north-east wind blows strongly at first, raising clouds of dust, which, as well as being unpleasant, is the cause of sore throats and other ailments. March, April, and May, until the monsoon breaks, are hot unpleasant months. During these months everyone who can make any excuse to go to the hills hurries out of Colombo, and numerous are the "inspections" of Kandy and Nuwara Eliya.

*Nuwara Eliya* is the sanatorium and hill station of Ceylon. Situated in beautiful surroundings at a height of 6,200 feet, it is reached in about ten hours' travelling by rail from Colombo.



During some months of the year it possesses a climate equal to the English climate on its best behaviour, but during the monsoons it experiences a good deal of wet, misty, unpleasant weather.

Nuwara Eliya is much patronized by Colombo residents, many of whom have bungalows there. For officers there is a furnished quarter, which is allotted in turn to applicants, preference being given to junior married officers and those on duty. Besides this there are quarters for the general, the deputy assistant adjutant-general, and the medical officer. For the accommodation of others there are several hotels, the Hill Club, and a few boarding-houses. The hotels are very expensive, like everything else in Nuwara Eliya, and the cost of bungalows is absolutely prohibitive. Therefore one of the attractions of Ceylon—a hill station within a night's journey from Colombo, where one can spend a few days' short leave when oppressed by the climate—is found to be an impracticability, at least for a married man. The cost of travelling and of hotels is too high for most of us to indulge in such trips, and from experience I have no hesitation in saying that when two months' leave is obtained one can have a much better time and, at the same time, a less expensive holiday by crossing over to India, and spending one's leave at Ootacamund or Coonoor.

*Diyatalawa* is a hutted camp to which the troops are sent annually for musketry and field training. It is situated on open downs at a height of 4,500 feet, and enjoys a mild climate. The heat in the day-time is tempered by cool breezes, while at night it is often quite chilly. Though a pleasant change from the enervating atmosphere of Colombo, it is not a place that one would voluntarily spend much time in. The accommodation is bad. The medical officer is provided with an old and dilapidated tin hut consisting of three tiny rooms, into which he has somehow to squeeze his family and belongings. The surroundings are dull, and there is little to do there.

*Trincomalee* used to be one of the best stations in the East. It is a lovely place, and every sort of sport can be had within a few miles, but to the great sorrow of everyone it has been abandoned. Kandy, too, a pretty and pleasant place where troops used to be stationed, is now occupied only by a company of the Indian infantry.

*Expenses.*—Everything in Ceylon is expensive. Wages are much higher than in India, and the servants are not so good. A really good cook is a treasure which is seldom found. The Cingalese are cleaner and more intelligent than the Tamils, but are lazy, conceited, and quick-tempered. The Tamils, except for a

small class known as Trinco Tamils, are immigrants hailing from South India. They are exceedingly stupid, and are not always clean, but a well-trained boy makes a good servant. The best servant is the Trinco Tamili, and one is fortunate to get a good "boy" of this class. Servants' wages for a family generally amount to £9 or £10 a month.

*Food* is dear and inferior in quality. Beef and mutton, chicken and eggs are all imported from India. The beef is old cart-bull and the mutton is goat. No sheep are slaughtered in Colombo, a fact of which most of the residents are unaware. Fowls and eggs gain so much in value by the sea voyage that Indian eggs cost a shilling a dozen, and immature chickens anything from a shilling upwards. Fruit and vegetables are lacking in variety, and are scarce and expensive. Oranges, pine-apples, and papaw are usually the only fruits obtainable, though sometimes as a rare treat mangosteens can be procured at a price. Fortunately the Ceylon Cold Storage Company keep a well-stocked larder, from which, when things get too bad, the harassed housewife orders beef, mutton, game, poultry, ham, etc. Such items, though largely swelling the monthly bills, make life endurable.

*Clothes.*—Only the lightest of clothes are required in Colombo. Cotton or linen suits are worn through the week, while on Sunday a thin suit of blue forms the conventional calling outfit. Only the thinnest of cotton underclothes can be worn, and believers in wool next to the skin had better stay at home unless they are prepared to suffer the tortures of prickly heat.

Plenty of flannel tennis trousers should be brought out, and an unlined Irish tweed coat is useful for wear after games. In fact, tennis flannels and a tweed coat are the almost universal wear in the afternoons. Warm clothes are necessary in Nuwara Eliya, where it gets very cold after sunset. It is well to bring out all the clothes and boots required for three years, or else to make arrangements to have things sent out as required. Almost everything can be bought in Colombo shops, but the prices are 50 per cent higher than at home.

A burberry or some other form of waterproof coat, made without rubber, is indispensable, as rain is "hard and frequent." Sola topees are worn until 4 p.m., and squash hats are the favourite wear afterwards. Straw hats are reserved for Sundays and race days. There should be as little silk as possible in coat linings or elsewhere, as silk invariably perishes in a few months of the Colombo climate. It is necessary to bring out one's tunic and mess kit, as they are

worn up-country, and even in Colombo full dress uniform is compulsory at the levée and reception at Government House on the King's birthday. It is well to have an old tunic for this occasion, as it is the ruination of a new one.

*Health.*—Colombo is not unhealthy. Malaria does not exist in the fort where the troops are quartered; the few cases that occur there have acquired the infection elsewhere. Enteric fever is very rare. Only one case has occurred among the troops in two years.

The only diseases at all common are dysentery and "seven days' fever." The latter is fairly common at times, and somewhat resembles dengue, but is a much milder disease, and differs in other respects. On the other hand, although specific diseases are rare, the debilitating effects of the climate tell on everyone; and a tired, listless manner, with a total lack of energy in business or pleasure, are common evidences of a prolonged residence in the country. In this respect Ceylon is far worse than India, owing to there being no semblance of cold weather to look forward to as a break in the monotony of warm muggy days.

*Conclusion.*—Enough has been said to point out the more important of the advantages and disadvantages of a tour in Ceylon. To sum up briefly—Ceylon is not a bad station for bachelors. The climate is not unendurable, quarters are fairly good, and there are enough for all. Games and amusements can be had in plenty, and big game shooting can be obtained by a keen sportsman, though some trouble and expense is necessary to get anything worth having. Best of all, Ceylon is a three-year station.

For a married man matters are somewhat different. Quarters are inconvenient, servants troublesome, food indifferent and expensive. The climate is trying to women and children. Children over five should not be brought out, and younger children are apt to grow thin and weedy. The expense of living swamps the extra allowances—good though they appear—which are drawn in Ceylon, and leaves little of one's pay for other purposes.

One is bound to judge Ceylon by an Indian standard, and I have never met anyone knowing both countries who did not prefer India. One misses the easy friendliness and good-fellowship, the unconventionality and inexpensiveness of life in India, and one is apt to think that the smallness of the island makes for pettiness just as the largeness of India makes for broad-mindedness.

But Ceylon has its points, and those who do not know India more readily appreciate them. But to those who are coming to Ceylon expecting to find it a second and better edition of India, I would offer Mr. Punch's advice—don't!

## Reviews.

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### REPORT OF THE MEDICAL OFFICER TO THE LOCAL GOVERNMENT BOARD FOR 1912-1913.

The report for the last official year, 1912-1913, is divided into six sections, dealing respectively with the General Death-rate and Mortality according to Age, the acute infectious diseases, tuberculosis, some special matters dealt with by the medical staff of the Board, vaccination, and certain auxiliary scientific investigations that have been carried out.

The general death-rate from all causes for the year 1912 fell to 13·3 per 1,000, the lowest yet recorded. The rate for the quinquennium, 1871-1875, was 20·9, from which figure it has declined in successive five-year periods as follows: 19·8, 18·7, 18·5, 18·5, 17·6, 16·0, and in 1906-1910 to 14·4. In regard to registration, the reforms introduced by the present Registrar-General are referred to, and it is shown how important has been the gain in accuracy and amount of information that has been obtained. Amongst these the chief are the substitution of the administrative area for the registration area as the local unit for tabulation of births and deaths, the transference of deaths from area of occurrence to area of residence in certain cases, and the adoption of new tables of causes of death, identical with those required in the annual reports of medical officers of health, and of the International Nomenclature.

In the account of the prevalence of infectious diseases it is mentioned that 110,551 cases of pulmonary tuberculosis were notified during the year, this being the largest number of any notifiable disease; next came scarlet fever with 107,477 notifications. The enteric notifications numbered 8,262, and there were only 109 of smallpox, and 31 of typhus. A most striking diagram shows the great diminution in mortality during 1912 from the three diseases, scarlet fever, diphtheria, and enteric, since 1901; in the two former there has been a reduction of 60 per cent, in the last-named the reduction has been 70 per cent on the figures for that year. In regard to diphtheria the difficulties attending its administrative control are referred to, especially that depending on the protracted infectivity of the disease. An instance of persistently virulent bacilli detected in the throat of a patient eight months after attack is mentioned; complete isolation in such a case would be impracticable, modified domiciliary isolation might be carried out. An instructive case is referred to of a patient discharged after six weeks in hospital and three weeks in a convalescent home, who was attended three weeks later for a suppurative sore of the scalp; from this sore were isolated virulent diphtheria bacilli, and fifteen diphtheria cases were traced to infection from the patient.

For enteric fever a most satisfactory report is furnished. In the decade, 1871-1880, the annual death-rate per 100,000 from this disease in England and Wales was 33; in the succeeding decades it was 20, 17, and 9 respectively; for 1911 it was 7, and for 1912 only 4. For London the rate in 1871-1880 was 24; in the succeeding decades it was 19, 14, and 7; for 1911 and for 1912 it was 3 per 100,000. The highest case-rates per 100,000 for 1912 in the county boroughs were 89 at Bradford and

82 at Wigan; for the counties the highest rates were in the North Riding of Yorkshire (42), Durham (38), and Lancashire (37). In the county of London the case-rate was 16 per 100,000. The importance of shellfish (especially oysters, mussels, and cockles) as a means of conveying enteric contagion is alluded to, and the fact noted that (as was found at Manchester) steaming or cooking the mussels, etc., is not always sufficient to kill the pathogenic micro-organisms that may be present. Draft regulations for dealing with pollution, and giving additional powers to sanitary authorities to deal with shellfish beds, are now under consideration by the Board. Two outbreaks of enteric due to water, and three due to milk, are described in detail in the Report, and will be referred to subsequently. With regard to the "carrier" problem it is stated, as the result of Dr. Ledingham's investigations, that "if on sufficient and competent examination of the excreta of enteric fever cases at the time of convalescence the result is negative, the subsequent development of the carrier state is improbable; if on the other hand it is positive, the possibility of the carrier condition remaining requires to be taken into serious consideration." With careful examination, therefore, of all enteric convalescents before discharge, the need for subsequent attention by the M.O.H. can be substantially limited.

The difficulties in the administrative control of measles epidemics are referred to: certification of first cases in a family by the medical attendant or parent would be helpful; compulsory notification under the Act has not had any marked success, and many local authorities have obtained permission to revoke the orders for this notification. In Manchester, on the other hand, powers have recently been obtained to make it obligatory on the parent to notify in all cases of measles or whooping-cough. Pneumonia and broncho-pneumonia account for about 64 per cent of the measles deaths; a fatal result used generally to be assumed to be due to the presence of the pneumococcus, but recent observations of Thursfield, Eyre, and others indicate a predominance of streptococcic infections. Careful cleansing of the mouth and fauces should be carried out, as in diphtheria and scarlet fever, by which means reduction of pulmonary complications, and of consequent fatality, may be hoped for.

Of small-pox there were 121 cases notified during 1912 in England and Wales, with 8 deaths; the most extensive prevalence occurred in Bristol, where 58 cases were notified during the year, of mild character, with only 3 deaths. In 1913 a small outbreak of 26 cases occurred in Newhaven and the neighbourhood. In each of these instances the introduction of the disease was traced to a sailor arriving from a foreign port with very mild smallpox. Cerebro-spinal fever and poliomyelitis have been made compulsorily notifiable since September, 1912; it is considered that some of the cases notified as the former disease were really poliomyelitis; the prevalence has been chiefly in London and in urban districts.

With regard to tuberculosis, as to which notification became compulsory on January 1, 1912, for the lung affection, and on February 1, 1913, for all forms of the disease, Dr. Newsholme adverts to the great differences that exist in various parts of the country in the proportion between cases notified and deaths; and, without attempting to draw any decided inference, suggests that where the phthisis notifications do not number more than twice the deaths, failure to notify may occur. The

existence of satisfactory local administrative arrangements for tuberculosis control, and the provision of facilities for examination of sputum, are two points of importance to be considered in this connexion. Comparison between districts based on notification returns is deprecated at present; death-rates are still the most satisfactory means for determining the local incidence of the disease.

An instructive, but not edifying, table is given, showing the course of "abstention" from, and "acceptance" of, vaccination in 1893-1897 and subsequent years. In the quinquennium, 1893-1897, the abstentions, including cases exempted, postponed, and remaining, formed 21 per cent of the births, the acceptances (children vaccinated) amounting to 67·7 per cent; from 1898 the abstentions diminished year by year until 1904, when they were only 14·5 per cent; since that year they have risen to 38·9 per cent in 1911. The actual percentage of children "exempted," which was 5·1 in 1898, fell to 3·6 in 1902; it then increased gradually to 5·8 in 1906, and thereafter rapidly to 28·5 in 1911. The result is that the percentage of children born that are actually vaccinated, which in 1905 reached 75·8, in the year 1911 dropped to 52·3, so that at the present time almost half the infants that are being added to the population year by year are unprotected from smallpox. The percentage of "conscientious objections" was 31·1 in 1911.

Dr. Bruce Low contributes detailed accounts of the progress and diffusion of plague, cholera, and yellow fever throughout the world in 1911 and 1912; these will be of the greatest use to workers in epidemiology. With regard to plague in India, there were few indications at the end of 1912 of any abatement in its virulence, though the deaths registered (306,088) in 1912, were less than half those in 1911. It is estimated that during the present plague prevalence (which has lasted for seventeen years) the deaths from this cause must have considerably exceeded eight millions. Four provinces have been especially affected, the Punjab, Bombay Presidency, the United Provinces of Agra and Oudh, and Bengal. The principal measures at present in use for its control are (1) temporary evacuation of infected quarters, (2) inoculation with Haffkine's prophylactic, and (3) systematic destruction of rats, with structural improvements in houses to render them reasonably rat-proof. It has been the case that certain provinces have almost entirely escaped plague in recent years, and others have suffered but slightly. Investigations made to discover the reason of this have confirmed the view that "much of the apparent immunity of certain localities is due in large part to the nature of the habits and customs of the people, and to the arrangement and structure of their dwellings, which do not favour infestation by rats." This extremely important generalization is being acted upon, and efforts made to convince the lower classes that the rat is not a domestic animal, but one that should be kept out of the dwelling and away from its vicinity. With regard to cholera in India (which caused 376,440 deaths in 1912) the present position as to causation is as follows: apart from the use of specifically contaminated water and food there are four important factors in its propagation: (1) Convalescent patients discharged from medical supervision while still infective; (2) healthy persons acting as "carriers," and excreting cholera vibrios without themselves showing any symptoms of the disease; (3) flies; (4) the personal habits of the people.



Dr. S. W. Wheaton reports on an outbreak of sixty-nine cases of enteric fever at Strood, distinctly traced to the water supply, that had been specifically contaminated by infective material washed from drains or cesspools into the adit in the chalk, whence the supply was derived. The reservoirs and mains were disinfected with a 1 in 20,000 solution of chlorox, followed by the continued addition of 1 per 100,000 to the water in the low level reservoir, through which the whole supply passes previous to distribution. Only five cases occurred after this was done. Dr. Wheaton considered that the Strood water was not safe for use, and that a fresh source of supply should be sought for. This example is a further illustration of the risk attaching to a chalk water that does not fulfil the conditions of a very low and constant bacterial content, and a high and constant degree of hardness: the water had been found to contain an increasing amount of chlorides, albuminoid ammonia, and nitrates, and *Bacillus coli* in as small a quantity as 1 c.c.

A very interesting history of the far-reaching and long-continued pathogenic action of an enteric carrier is given by Dr. Monckton Copeman. In the years 1909-1911 there occurred thirty cases, and in 1912 there were twenty-five cases of enteric fever in a district in Yorkshire, most of which were traced by Dr. Copeman's careful investigations to one person, who had acted as housekeeper, and in charge of the dairy, first at one farm, and subsequently at another. The total number of cases for which this carrier was directly or indirectly responsible is estimated by Dr. Copeman to have been about sixty, among which there occurred six deaths. It was particularly unfortunate that her occupation brought her into connexion with the handling and distribution of milk. Dr. Copeman suggested that she might be employed at the infectious diseases hospital, but unfortunately this could not be arranged, neither did the proposal to provide her with a weekly allowance (so as to obviate the necessity for working in a position where she might be a potential danger to the community) meet with acceptance. Some special provision for such cases seems to be required. This report by Dr. Copeman is a very instructive relation of the hunting out a source of infection that had previously been unsuspected.

Another interesting report is that by Dr. H. A. Macewen on an outbreak of the same disease at Ringwood, in Hampshire, which will not be agreeable reading to the local public health committee or their medical officer. Of the total seventy-seven cases all but thirteen could be traced, directly or indirectly, to a polluted water supply, and it must be admitted that, as stated in the report, "the condition of affairs administratively was very unsatisfactory." It is surprising that the state of things described in the report should have existed at this time of day in an English town of 3,000 inhabitants.

It is probably not generally known that an industry exists for breeding maggots for sale as fishing bait and for feeding trout. It is said by Dr. Kaye to be "quite impossible to convey by words any adequate idea of the character of the atmosphere" of the chamber where this breeding is carried on: "strong, pungent, and loathsome are mild terms to apply to it." There will be a general agreement with Dr. Macewen's opinion that by-laws should be framed for this "industry," which may not improbably increase in importance. Of course such an establishment is

inevitably a breeding ground for flies, and this may constitute a real danger.

Among other important papers in this volume are an account of the bacteriological supervision of enteric convalescents, by Dr. J. C. G. Ledingham; of an inquiry into the cause of death in measles, by Dr. H. Thursfield; and a paper on the biology of the rat-flea, by Mr. C. Strickland. The volume is equal in interest to any of its predecessors.

A. M. D.

**MERCK'S ANNUAL REPORT OF RECENT ADVANCES IN PHARMACEUTICAL CHEMISTRY AND THERAPEUTICS. 1913.**

This number contains a monograph on lecithin to which is appended a bibliography of twenty-one pages. The importance of lipoids, of which lecithin and cholesterin are examples in the animal economy, is now recognised. Lecithin has been administered with success in tobacco amblyopia.

Dionin for some time has been an indispensable remedy in ophthalmic practice. The introduction of  $\frac{1}{2}$  gr. pilocarpine hydrochloride into the conjunctival sac followed by  $\frac{1}{2}$  gr. of dionin has been successful in the treatment of acute glaucoma. Besides the well-known property of dionin in clearing corneal opacities, its value in iritis is great.

Solutions of mastic in alcohol, benzol, or chloroform, to which a small proportion of linseed, or castor oil, or resin is added, are being used extensively on the Continent for the dressing of wounds. Gross impurities are removed from the wound by means of sterile forceps, the surrounding skin is painted with tincture of iodine, and the mastic varnish is applied to the injured surface and neighbouring parts by a cotton-wool swab. Sterile gauze is then laid over the area and is left in place till the wound has healed. Spindler observed primary union in all clean-cut and operation wounds dressed in this manner. Only 6 per cent of 2,000 injuries suppurated. Neugebauer has painted burns with mastic varnish before covering them with cotton-wool.

Ninhydrin is the reagent used for the detection of amino-acids by Abderhalden in his test for pregnancy, cancer, and other conditions. This reaction is attracting much attention at the present time.

These extracts show that Merck's Annual Report is a very useful work of reference.

C. B.

**ALIMENTARY TOXÆMIA: ITS SOURCES, CONSEQUENCES, AND TREATMENT.**

Discussion opened by W. Hale White, M.D., F. W. Andrewes, M.D., Vaughan Horby, M.D., Robert Saundby, M.D., W. Arbuthnot Lane, M.S., and J. F. Colyer, M.R.C.S., L.D.S. (From the *Proceedings of the Royal Society of Medicine*, 1913, Vol. vi). London: Longmans, Green and Co. 1913. Pp. xlv + 380. Price 4s. 6d. net.

The subject of alimentary toxæmia has of recent years received very considerable attention from the medical profession, and alike from its importance and the divergent views concerning it held by different authorities, should be a matter of great interest to our practitioners of medicine. The present volume, reprinted from the *Proceedings of the Royal Society of Medicine*, contains a complete report of the valuable discussion arranged by that Society in March of last year.

The discussion was opened with a "General Survey" by Dr. Hale White, putting forward some criticisms of present theories and practice, and indicating the directions future work might take. The five succeeding opening papers were by Dr. Andrewes, on "The Bacteriology of the Alimentary Canal"; by Dr. Vaughan Harley, on "The Toxins of the Alimentary Canal"; by Dr. R. Saundby, on "The Consequences and Treatment of Alimentary Toxæmia from a Medical Point of View"; by Sir W. Arbuthnot Lane, on the same subject from a "Surgical Point of View"; and finally by Mr. J. F. Colyer, from an "Odontological Standpoint." Dr. Andrewes first gave a general review of the bacterial flora of the alimentary canal, and then considered the part played by bacteria in the production of alimentary toxæmia. In the course of his paper he pointed out the necessity of a clear conception of what is meant by the term alimentary toxæmia, which he defined as "the absorption from the alimentary canal of chemical poisons of known or unknown composition, in sufficient amount to cause clinical symptoms, the blood serving as the channel of distribution." He excluded by this definition all cases in which there is an actual bacterial invasion of the blood-stream. Dr. Vaughan Harley dealt with the subject from a chemico-pathological standpoint, and discussed the formation and effects of the various toxic substances developed in the bowel in cases of intestinal stasis. Dr. Saundby, after mentioning certain consequences of alimentary toxæmia, laid down the principles of treatment. Sir W. Arbuthnot Lane read a long and important paper setting forth his well-known views on "The Consequences and Treatment of Alimentary Toxæmia." Mr. J. F. Colyer prefaced his remarks by a reference to the two chief sources of oral sepsis, namely, caries and gingival disease leading to periodontal sepsis, and then considered the possible relationship of dental sepsis to general alimentary conditions and the general lines of treatment to be kept in view.

The discussion was continued by fifty other speakers whose contributions treated the subject from different specialist points of view; all were of great interest, but special mention may be made of the sound, sagacious, and amusing remarks by Sir James Goodhart, and of the paper by Dr. Hertz.

The contents of this volume will well repay perusal and form a noteworthy contribution to the literature of alimentary toxæmia. The book is well printed on good paper, and is furnished with an excellent index.

O. L. R.

**THE ERRAND OF MERCY.** By M. Mostyn Bird. London: Hutchinson and Co. 1913. 8vo. Pp. 348. 17 illustrations. Price 3s. 6d. net.

This book is intended to be a history of ambulance work upon the battlefield, but the first few chapters deal largely with the history of medicine in very early times. The author points out how medicine was first monopolized by religious bodies, and was closely coupled with religious rites. The earliest form of hospital was a rest-house attached to some temple or church to provide lodging for sick persons who had made their way to the shrine to obtain relief for their sufferings. The military surgeons obtained their experience in the field independently of the restraining influence of the Church; consequently they adopted more

progressive treatment, and, indeed, the first advances in our knowledge of medicine were largely due to men like Paré, who broke away from the dogmatic laws evolved by sacerdotal authorities.

The writer then sketches the history of the Order of St. John of Jerusalem, and goes on to review the work of the army medical services of Europe during the Napoleonic wars and the Crimean Campaign, as also the medical service of the Federal Army during the Civil War in America. Dumant's work, which gave rise to the Red Cross movement, is next described. The author then goes on to the formation of the National Aid Society, and the work it accomplished in the Franco-Prussian War, as also the instruction in ambulance work undertaken by the St. John's Ambulance Association. The work carried out by voluntary aid societies during the South African War is described in Chapter XIII, while the next chapter reviews the working of the medical service of the Japanese Army during the Russo-Japanese War. This brings the history of ambulance work on the battlefield up to 1913, and Chapter XV contains a sketch of the work of the Royal Army Medical Corps and of voluntary aid detachments. Unfortunately, in referring to our army organization, the author has evidently got hold of some out-of-date manual, as the army corps is no longer the tactical fighting unit of the British Army, while the Army Medical School was moved from Netley ten years ago.

The book gives a very good history of ambulance work, and can be recommended to any one interested in the subject, but especially to those connected with voluntary aid detachments.

J. V. F.

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## Current Literature.

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**Salvarsan and Neosalvarsan.**—An attack on salvarsan which was made some weeks ago by a Dr. Dreuw, one of the eight Berlin surgeons entrusted with the examination of prostitutes, has resulted in a remarkable testimony in its favour by an overwhelming number of the best practitioners in Germany. It appears that Dr. Dreuw is an old opponent of salvarsan, his objection to this remedy being the result of prejudice rather than personal experience. Having collected the accounts of all the deaths and other untoward incidents following the use of salvarsan which he could find, he obtained an interview with the Minister for Public Health and induced him to institute an inquiry into the dangers of salvarsan. Before the inquiry had been instituted he published in the lay press his own opinions, and left the impression with the lay public that the accidents which had followed the use of salvarsan and neosalvarsan had caused the Minister to commence the inquiry. He demanded that both remedies should be forbidden, or their use restricted to doses corresponding with those allowed for arsenic in the official pharmacopœia. Naturally, Dreuw's communication roused a considerable amount of comment and public uneasiness, especially so as his position as

a "Sittenpolizeiartz" lent some official colour to his opinions. To this attack Neisser replied fully in the *Breslauer General-Anzeiger* for February 22, 1914, in which he said that this dispute was one between an insignificant number of surgeons with practically no experience, and the whole of the rest of the medical world with its experience of thousands and thousands of cases benefited by salvarsan as they had never been by mercury. After destroying Dreuw's arguments in detail, he finished by saying that when we considered what a scourge syphilis was to society we should hail Ehrlich as a benefactor of mankind.

This protest of Neisser's was followed in No. 58 of the same paper by a testimonial supporting his views, which was signed by over two hundred specialists and general practitioners, including the highest authorities in Germany.

In the *Neue Freie Presse*, for March 3, 1914, Professor E. Hoffmann, and Dr. Gustav Riehl, Professor-in-Ordinary for Dermatology, Vienna University, each reply to Dreuw's attack in the same strain, and in the *Königsberger Anzeiger* for February 26, 1914, Prof. Scholtz, Director of the Königsberg University Polyclinic for Skin Diseases, communicates, by request of the editor, a long article on the subject of these remedies, in which he points out that not more than 100 of the 275 deaths which have followed the injection of salvarsan or neosalvarsan, could in any way be attributed to the remedy, and then it was chiefly due to over-dosage; that cranial nerve disturbances are due to insufficient treatment and curable with salvarsan, and he expresses his belief that by its power of cutting short the infectious stage of syphilis salvarsan should gradually eliminate syphilis. Altogether, it appears likely that Dr. Dreuw will prove to have succeeded in enlightening the general public on the subject of salvarsan and neosalvarsan, but not altogether in the way he desired.

L. W. H.

#### **A New Method of Counting the Cells in Cerebrospinal Fluid.—**

R. Donald (*Folia Hæmatologica*, December 13, 1913) describes a new method of counting the cells in cerebrospinal fluid which is simple and accurate, requires no special counting chamber, and allows a differential count to be made at the same time. The counting chamber method has the disadvantages that the count must be done almost at once to avoid the fall in the cell count which results from degeneration of the cells, and it does not allow of a differential count in the same specimen. The methods of centrifugalization result in a large drop in the count from degeneration of cells, and that of Alzheimer is too complicated. The author makes use of his method of measuring liquids by drops delivered from a gauged nozzle, which was described in *Proc. Roy. Soc.*, 1913, B, vol. lxxxvi (see this Journal, May 14). A convenient size of nozzle is provided by a capillary pipette gauged in hole No. 80 of a Starrett Morse drill and wire gauge. This delivers drops of  $\frac{1}{15}$  c.c. volume with a fluid of average surface tension and at 20° C. For the delivery of a few drops at regular rate he recommends a hand pattern of ordinary mercury plunger tube made as follows: A piece of clean tubing of 1½ mm. to 2 mm. bore and 12 cm. to 15 cm. long is made slightly funnel-shaped at each end and one end tightly plugged with grease-free cotton wool. The tube is filled two-thirds full with clean mercury, and the other end then plugged with cotton wool. The dropping pipette is then attached

to this tube through the medium of a piece of rubber tubing about 3 cm. long. The plunger tube then serves to draw the fluid into the dropping pipette, and on reversing the action, to deliver it through the dropping pipette. During delivery of the drops the plunger tube is held at such an angle that the rate is not greater than one drop per second. A drop of the fluid is allowed to fall on a thoroughly cleaned and polished slide and allowed to dry without being spread. Drying is assisted by gentle warmth at a temperature of 40° C. When the drop is dry it is fixed by heat, or with alcohol, or in the collodion solution to be mentioned. The slide is immersed vertically in a thin solution of collodion (collodion B.P., 1, in about 9 of alcohol and ether mixture) for a minute or so. It is then hung vertically by a paper-clip till dry and the last remains of alcohol evaporated by heat. The stains recommended are Leishman or Giemsa, suitably diluted, or Pappenheim, the latter being best for showing up plasma cells, and prolonged staining with Giemsa being the best means of showing up degenerated cells. When staining by Giemsa it is recommended before diluting with water to dilute with an equal bulk of methyl alcohol, as this gives cleaner results. A little pool of the stain is put on the drop in such a way that it does not spread over the slide, and staining continues for ten to thirty minutes. The stain is poured off that end of the slide which is coated with collodion and replaced by 1 in 20,000 acetic acid, which is allowed to act for one or two minutes. The film is then rinsed and dried by laying on it a piece of blotting paper on which is pressed a pad of cotton wool wrapped in soft gauze. It is then warmed to receive a drop of melted vaseline of the smallest size which will just fill the space between the film and a cover-slip which is pressed down on the whole. The film may be counted through and through, or if cells are very numerous a number of fields can be counted. In this case the number of times the diameter of the circular microscopical field is contained in the diameter of the film is ascertained, and this number squared gives the number of fields contained in the film.

L. W. H.

**Opsonic Substances of Normal Sera.**—Hans Zinsoer and E. G. Carz (*Journ. of Exper. Med.*, vol. xix, No. 4, April, 1914) separated complement into its fractions by various methods, and then tested these split products for both alexin and for opsonic effects. In most of their experiments the separation was carried out by dialysis, and each fraction tested for hæmolytic activity with highly sensitized cells. They found that the globulin fraction (mid-piece) was not rendered inactive until it had been twice reprecipitated from salt solution by adding distilled water. Their results with these fractions indicated that when opsonic action could be determined at all it resided most powerfully in the end-piece, and never more than very slightly in the globulin or mid-piece alone. When phagocytosis occurred after the reconstruction of the complement by reunion of the fractions, it occurred also, and with nearly the same power, under the influence of the albumen fraction alone. Often, however, it seemed to disappear entirely, and results remained inconsistent until they discovered that the serum gained slightly in acidity during dialysis. When, by the addition of alkali, its reaction had been restored to that of normal serum, the albumen fraction or end-piece possessed definite opsonic activity, often almost equal to that of the unfractionated



serum. They were unable to reactivate the hæmolytic function of the end-piece by alteration of reaction. C. J. C.

**Cultivation of Filterable Spirochætes.**—S. B. Wolbach and C. A. L. Singer (*Journ. of Med. Research*, vol. xxx, No. 1, March, 1914) describe the development of a new species (*Spirochæte elusa*) of free-living spirochætes in the filtrate from water of a pond at Boston. Filtration through a Berkefeld "V" filter was carried out on July 13, 1913, and on August 19, the filtrate was cloudy from the presence of small, actively motile spirochætes. These were successfully cultivated through many generations in a hay infusion medium containing 1 per cent of dextrose and having its reaction adjusted neutral to phenolphthalein before sterilization by filtration. A solid medium, obtained by adding an equal part of 3 per cent agar jelly to the dextrose hay infusion, was also satisfactory.

Filtration experiments were controlled by adding *Bacillus prodigiosus* and a minute motile bacillus which was found in filtrates from a Berkefeld "V" filter to the hay infusion culture. The spirochætes, under various methods of filtration, including positive pressure of sixteen to twenty pounds to the square inch, suction by means of a water aspirator, and gravity, passed through Berkefeld "V," "N," and "W" filters. Four attempts with Chamberland "F" and one with Chamberland "B" filters gave negative results. In order to secure a positive result the time of filtration should not be less than thirty minutes, and the amount of material not less than 50 c.c. The morphology of the spirochæte shows extreme variation, from highly motile short forms, having but one or two turns, to long motionless filamentous forms.

In the earlier experiments a definite incubation period was necessary before the spirochætes made their appearance in the filtrates, but it would appear that repeated filtration enhanced the filterability of the organism, for in some of the later experiments they were to be seen in the filtrate immediately after filtration. C. J. C.

**Distribution of Spirochætes in Infected Ticks.**—By adopting a special technique of staining with Giemsa's stain, Wolbach (*Journ. of Med. Research*, vol. xxx, March, 1914) has been able to carry out some researches on *Spirochæta duttoni* and *S. kochi* in experimentally infected ticks (*Ornithodoros moubata*). The method, stated as briefly as possible, is as follows: Immediately after death remove by dissection in normal saline the body contents of the tick, cut in slices not more than 2 mm. thick, and fix in saturated solution of corrosive sublimate 2 parts, absolute alcohol 1 part for forty-eight hours or longer. Dehydrate in alcohol, clear in cedar oil, and embed in paraffin. (The tissues must not be touched by metal until after clearing. Sections should be 2  $\mu$  thick). Remove paraffin by xylol and bring to water through graded alcohols. Treat with 3 c.c. saturated alcoholic solution of iodine in 100 c.c. of 70 per cent alcohol for ten minutes. Treat with 95 per cent alcohol till the yellow colour is removed, wash, and place in 0.5 aqueous hyposulphite of sodium solution for ten minutes, wash in running water five minutes, and rinse in distilled water. Stain in freshly diluted Giemsa solution for about twenty hours. The dilution of the stain should be 60 drops of stain to

100 c.c. distilled water, 10 c.c. methyl alcohol, and 2 drops of 0.5 per cent sodium carbonate solution. The stain is replaced twice during the first hour. The water used for diluting must be free from acids (including carbonic and volatile organic) and should be corrected as follows: Take four lots of 300 c.c. distilled water and add respectively 1, 2, 3, and 4 drops of 1 per cent sodium carbonate, test 10 c.c. from each by adding 2 or 3 drops of fresh solution of hæmatoxylin in absolute alcohol; the water is suitable if it acquires a violet tinge in four or five minutes, but for staining spirochætes a further addition of 2 drops of 0.5 per cent. sodium carbonate is recommended. For differentiation transfer the sections directly into two changes of colophonium 15 grm., acetone 100 c.c.; fifteen to thirty seconds is usually sufficient. This fluid should be renewed when the precipitate fails to redissolve. Pass the sections rapidly through acetone, 70 c.c. with xylol 30 c.c.; pure xylol; cedar oil; and mount in cedar oil.

Examination of four ticks from lots shown to be non-infective failed to demonstrate spirochætes in any tissue. Ten ticks, known to have ingested blood containing spirochætes and dissected from two to forty-seven days after feeding, contained spirochætes in the muscular and connective tissue structures of practically every organ of the body. The most striking thing in the distribution of the spirochætes is the failure to find them in epithelial cells. They were found in large numbers in the peritracheal fat cells, occasionally in the cells lining the body cavity, and in ganglion cells of the brain, and in enormous numbers in connective tissue structures. From this it is concluded that they multiply in these tissues and not in epithelial cells. They show a wide range in morphology, and some contain granules of a greater width than the body of the spirochæte. Minute granules, comparable in size with those shed by spirochætes and with those found in the cells of the Malpighian tube and in ova, have been seen in connective tissue, but in no greater abundance in infected ticks than in the uninfected. On the other hand, the larger granules, which stain a deep red, were not found in any of the uninfected ticks. The presence of spirochætes in the wall and lumen of the salivary glands, coxal glands, and gut proves the possibility of infection by any of these routes. The writer is of opinion that the minute granules and comma bodies found in epithelial cells, and probably those in other tissues, are not stages in the development of spirochætes, but that the larger granules, coiled and encysted forms derived from spirochætes, occurring in connective tissue structures, may possibly represent resting or multiplication stages.

C. J. C.

**A New Malaria Parasite of Man.**—J. W. W. Stephens (*Proc. Roy. Soc.*, Ser. B, vol. lxxxvii, No. B596) describes as new a malarial parasite observed by him in a blood slide sent from Pachmari, India, and suggests the name *Plasmodium tenue*. Drawings of 150 consecutive parasites led him to believe that it is different from the ordinary malignant tertian parasite. It is extremely amœboid, the cytoplasm appearing as long thin processes, often extending across the cell, and always scanty. Forms resembling rings occur, but comparatively rarely. The nuclear chromatin is large in proportion to the volume of the parasite, and takes the form of bars or rods, strands, curves, forks, patches, etc. The

occurrence of the chromatin as a dot, as in the ring forms of other species, is rare.

He claims that it differs from the malignant tertian parasite in its amœboid activity and in the abundance and irregularity of its nuclear matter; from the simple tertian parasite in that it is smaller, the amœboid processes are more delicate, the chromatin is more abundant and more irregular, and that typical rings are absent or exceedingly rare. From quartan it is easily distinguished by its amœboid activity and its tenuity.

C. J. C.

**The Management of Voluntary Aid Rest and Dressing Stations (Germany).**—Anhalt für die Einrichtung und den Betrieb von Verband und Erfrischungsstellen durch Vereinigungen des Preussischen Roten Kreuzes.

I.—SOME GENERAL REMARKS ON THE GERMAN ARMY MEDICAL ORGANIZATION AFFECTING EVACUATION.

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No definite rules can be formulated for the lines on which dressing and refreshment stations are to be laid out; their existence, position, size, etc., are dependent on so many different factors.

Great care is to be taken in determining which of the sick and wounded are fit for transport.

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II.—CARE OF THE SICK AND WOUNDED IN THE OPERATION AREA, AND ON THE LINES OF COMMUNICATION.

The regular medical service prepares: (a) On the line of march, collecting posts for sick. (b) Where lengthy halts are made, local reception hospitals. (c) During an engagement, regimental and main dressing stations. (d) Places to which the slight cases are marched. (e) Places to which the more severe cases are conveyed, field hospitals.

To liberate the field hospitals, those unfit for transport are taken over by clearing hospitals.

On the lines of communication there are other hospitals, including those set apart for mild cases, convalescents and infectious cases.

The medical service on the lines of communication is under the D.D.M.S., assisted by assistant directors and certain medical detachments. Their duties are the general care of the sick and wounded on the lines of communication and evacuation of them into the home territory. Voluntary aid detachments are under the voluntary aid delegate of the lines of communication.

III.—TRANSFER OF SICK AND WOUNDED FROM LINES OF COMMUNICATION TO HOME TERRITORY.

Rapid evacuation of the field hospitals is essential: (a) Bad cases are sent to home territory; (b) mild cases to lines of communication hospitals. This is carried out by means of trains and boats. The distribution of sick and wounded is, generally, in the hands of the D.M.S.

For evacuation on each line of communication there is a sick and

wounded transport detachment. Their duties are: (1) The preparation of the various forms of transport; (2) the care of the sick and wounded during transit. The personnel of this unit is: 7 medical officers, 1 quartermaster, 7 N.C.Os., 8 sick attendants, 8 transport soldiers. Their equipment is held at medical depots on the lines of communication.

The sick and wounded transport detachment is assisted by a delegate from the voluntary aid and a convoy detachment, voluntary aid. The convoy detachment consists of 164 sick attendants and 25 female nurses. The men are divided into four sections, each forty-one strong, each section is divided into three subsections. This unit is usually at headquarters of the lines of communication, in the neighbourhood of a railway station. The whole or sections may be sent to other railway stations, or waterways, where sick and wounded are arriving after an engagement. As the army advances the whole troop or sections may be sent forward as required. Wherever the unit is halted it forms a rest and dressing station. At rest and dressing stations, besides assistance given by the unit, the cases are sorted out; those unfit for transport are transferred to the nearest hospital, the remainder are collected for transfer to the home territory. Arrangements are made in the waiting-rooms for accommodating these cases at night. The voluntary aid detachment supplements the personnel of the sick and wounded transport detachment as required. The commandant of the railway station or lines of communication is responsible for finding the food supplies. When sick and wounded are transferred to the home territory, they are accompanied by the personnel of the voluntary aid and not by regulars.

All wounded are supplied with wound tallies when first dressed. If any cases have been overlooked tallies are supplied before the cases are sent to the home territory; any special instructions that new attendants ought to know with regard to treatment or dressing are added. Entries are made by medical officers only.

#### IV.—MEANS OF TRANSPORT ON LINES OF COMMUNICATION.

These consist of: (a) Hospital trains and specially fitted auxiliary hospital trains allotted by the D.M.S. (b) Auxiliary hospital trains formed by order of the I.G.C. of railways. (c) Passenger trains taking sick and wounded got together by the railway authorities at the instance of the sick and wounded transport detachment. (d) Hospital ships, auxiliary hospital ships allotted by the D.M.S. or locally acquired by the lines of communication.

Hospital trains have thirty-nine corridor carriages; they are complete with kitchen, etc., and do not usually require assistance from the rest and dressing stations.

Auxiliary hospital trains equipped to scale carry about 300 cases. They are equipped either by the transport detachment or in the home territory. Auxiliary hospital trains may be equipped in peace time by arrangement between the War Office and the Ministry of Public Works. The War Office decides in each case if voluntary aid detachments are to assist in equipping these trains. They are composed mostly of fourth class carriages. There is a special wagon with a heating apparatus, if steam is not supplied from the engine. As a rule, they have no

kitchen and are dependent on rest and dressing stations for food. The carriages are equipped at the station where the equipment is stored. The amount of personnel varies with requirements. These trains are used exclusively for the transport of sick and wounded.

Those auxiliary hospital trains which are not equipped to scale are under a S.M.O.; the personnel is found by the transport detachment on the lines of communication, and the equipment from medical depots, lines of communication. As regards personnel, 100 sick require 1 to 2 medical officers, 2 N.C.Os., and 10 to 12 medical orderlies or men of voluntary aid detachments attached to the sick and wounded transport detachment. Auxiliary hospital trains from the home territory are manned and equipped by the medical authorities. One N.C.O. and an orderly are allotted to every two carriages.

Passenger trains for sitting-up cases have no medical officer. The loading of the train is supervised by a medical officer of the transport detachment or of the railway. The services of a medical officer are available at the larger stations where the train stops. Attendants are found by the voluntary aid detachment convoy; numbers as required. There is a military escort to this train. These trains travel by day. Arrangements are made for night quarters for sick and attendants at or near certain railway stations; arrangements are also made for food and ablution at these places. Drinking water is to be supplied. In the home territory these arrangements are usually made by a delegate of voluntary aid in conjunction with the military authorities. No previous arrangements are made in peace time.

Transport by river and canals.—This is organized in conference with the director of works on the lines of communication. The instructions are to arrange a collecting station at the place of embarkation, and to make use of hospitals, tents, or barracks. Food at the place of embarkation is provided by the authorities. While travelling by water only light refreshments are given; the boats lie up for the night at places where rest and dressing stations have been arranged. The hour of arrival and the number of sick to be catered for are intimated beforehand. Supper and breakfast are provided at these places. A good supply of drinking water is to be kept on board and at the rest and dressing stations.

Field railways may be used to bring sick and wounded to rail- or water-head.

S.M.Os. of trains and boats receive all information regarding cases from the transport detachment, including nominal rolls with entries, where necessary, in the column of remarks. There is also a timetable for places where they will halt, etc., to allow them to make the necessary arrangements for catering. The S.M.O. gives a receipt to the station commandant for refreshments issued.

Movement of the trains for the distribution of sick and wounded is arranged by the railway authorities. Distribution of sick and wounded among the general hospitals is arranged in general by the D.M.S. and the medical department at the War Office, and in detail by the lines of communication authorities. The latter have certain general hospitals allotted to them, and also places for special cases of illness. General hospitals notify O.Cs., lines of communication, the number of empty beds available

If it is a question of slipping coaches at various places, the transport detachment must see that the sick are placed in the proper carriages. As far as possible, when advising general hospitals of the arrival of cases, details should be given of the class of cases coming. The hour of departure of trains, and the number to be fed at rest and dressing stations, is telegraphed to the railway authorities. It is an advantage for the railway authorities to introduce a regular time-table, as far as possible, for the expediting of hospital trains.

#### V.—REST AND DRESSING STATIONS IN THE HOME TERRITORY.

##### *A.—General Remarks.*

Rest and dressing stations along the lines of communication to home territory are established in order to cater for the wants of patients travelling in auxiliary and improvised hospital trains. These trains are run, as far as possible, according to a time-table, and the services must be rendered rapidly in the short time during which the trains are halted.

On the lines of communication, and in territory outside the home area, these services are provided by the personnel of the sick and wounded transport detachment, assisted by the voluntary aid convoy detachment. The necessary equipment is usually drawn from the medical depots, lines of communication. In the home territory, on the other hand, the personnel is drawn entirely from voluntary aid, and the equipment through the district commanders by requisition on voluntary aid authorities. The outfits of the two areas are accordingly different. In the home territory, a large supply of dressings is to be maintained, and a double outfit of tableware (plates, spoons, cups, etc.). Rest and dressing stations in home territory must be prepared to cater for 320 sick per auxiliary hospital train, and 800 sick per passenger train, in addition to the train sick-attendants and staff.

It cannot be decided in advance in peace time where rest and dressing stations should be established in home territory. Information of the probable maximum requirements of the area, may, however, be given by the district commanders to the territorial delegates, so that they may lay in and store the required amount of equipment. Rest and dressing stations should be established at places where there is a general hospital, or a hospital of the voluntary aid societies, to which cases unfit for further transport can be transferred when the train stops. Cases showing signs of infectious disease should also be removed from the train. It is important to remember that the train must not be delayed in reaching its objective, and that these wayside hospitals should not be allowed to become overfilled with casual transfers. Cases dying should be removed from the train at rest and dressing stations, if time permits.

Refreshment stations are arranged by the military and railway authorities at suitable stations, and do not come under voluntary aid.

Rest and dressing stations might also be established in the same stations as refreshment stations, in which case the latter would prepare hot drinks, etc. This is not a usual arrangement. Night quarters for sick on passenger trains are, as a rule, provided at stations having catering arrangements, or at rest and dressing stations of the V.A.D.



At stations where permission is given for the distribution of refreshments to troops or sick, this work should not be carried out by trained voluntary aid people, as their services are too valuable.

Halts of auxiliary hospital trains are usually of forty-five minutes duration. These may be shorter on account of delays. Telegrams should be sent, if possible, to warn voluntary aid detachments of the shortened time, so that they may organize distribution of food, etc., to meet the occasion.

Duties of a rest and dressing station as a dressing station.—Dressings are only to be changed when absolutely necessary. Auxiliary hospital trains have a large staff and do not require much assistance at rest and dressing stations. Passenger trains have no medical officer and a smaller staff, and the patients in the train will probably require more treatment on arrival.

Duties of a rest and dressing station as a refreshment station.—The railway station commandant is responsible for producing the supplies, and the Red Cross societies that have equipped the rest and dressing stations are responsible for the distribution.

Rest and dressing stations in home territory are under the orders of the O.C. railway station. The station is equipped under the orders of the territorial and the L. of C. delegates. The former makes the peace arrangements, the latter sees them carried out on mobilization. Communication with the general hospital is made through the O.C. railway station. All rest and dressing stations, of course, are under the direction of the local administrative medical officer.

#### *B.—Preparation and Equipment of Rest and Dressing Stations.*

Rest and dressing stations are usually arranged at goods stations, where there is sufficient length of line and platform for military trains. They must be prepared to deal with auxiliary hospital trains with 320 sick and wounded, and passenger trains with 800 sick. How often their services will be required cannot be laid down at the time they are got ready.

Requirements as regards space.—(1) A dressing room capable of holding all medical and surgical material, as well as some changes of underclothing for the sick, is necessary. Facilities for performing urgent operations must be provided. There should be a room or a tent to accommodate temporarily cases removed from the train for transfer to hospital. (2) A living and dining-room for medical officers and male and female personnel, e.g., a railway waiting-room, or one or more rooms in conjunction with (4). (3) A shed to accommodate boilers and heating apparatus. (4) At least one large well-lit room, preferably several, to store food, utensils, prepare sandwiches, and in which to get food ready for rapid distribution. (5) A pantry for washing up; may be connected with (3). (6) Ablution arrangements for the personnel, and a suitable place for storing disinfectants. (7) Sufficient latrine accommodation.

There is a warning against using too small rooms, barracks, or tents, which would interfere with rapid administration. The trains are 400 to 500 metres long. The best position is in buildings near the centre of the siding, and not too far away. The latrines should be near each

end of the siding platform. All the rooms must be well lighted, and in winter there must be means for heating. For water supply see later.

Equipment.—*Nachweis des Sanitätshilfsmittel*, 1911, gives a list of presumable requirements. A supply of dressings is kept ready for some of the rest and dressing station parties, and the Red Cross societies concerned see that there is a periodical turnover to prevent deterioration. The provincial Red Cross authorities arrange in peace time the source through which their supply of dressings will be kept up. If articles of equipment, such as pots and pans, plates, etc., are not stored, arrangements must be drawn up with firms in peace time for their immediate delivery on demand. It is strongly recommended that a supply of ware, sufficient for twice the number of cases that will have to be dealt with at any one time, be provided. The local general hospital is not to be counted on for help should things run short. A definite scheme for replacing breakages and losses of equipment has to be drawn up.

Personnel at rest and dressing stations.—In order to carry out the work satisfactorily in the forty-five minutes allowed, the following personnel is considered necessary :—

- 2 doctors.
- 4 stretcher-bearers to carry sick and assist the medical officer in the dressing-room.
- 10 stretcher-bearers to help at refreshment table.
- 1 senior sister as superintendent.
- 10 lady helpers to assist at refreshment tables and in the railway carriages.
- 1 housekeeper for the kitchen.
- 4 female kitchen hands.
- 4 lady helpers to assist the medical officer in the dressing-room.

The personnel must be well trained in peace time. The numbers given above are considered sufficient. Too many workers are apt to get in each other's way. With regard to the men helpers, the stretcher-bearer class are considered quite good enough, as their duties are manifold and not of the brainy order. The senior sister is sufficient to look after the women, and more lady superintendents are unnecessary. The S.M.O. keeps in constant touch with the authorities who supply personnel and material, with a view to keeping his establishment up to strength. The personnel may have to go where they are most required, and in many cases they will not be able to remain at their homes, and they must be made to understand this and agree to it. Arrangements may accordingly have to be made to find suitable quarters for the ladies. The territorial delegate arranges with the hospital authorities the extent to which the personnel of rest and dressing stations are to be employed at the general hospital when they are not required at the station.

Detail of duties.—The two M.Os. are, as a rule, sufficient to deal with the requirements of the auxiliary hospital trains, as these have a medical staff. If the passenger trains are running full, the S.M.O. may requisition help from the general hospital. The stretcher-bearers employed to carry refreshments may also assist in carrying patients when required. Cases for transfer to hospital may be lifted out on stretchers, and remain on the platform for a little, if time presses, until they can be carried to the ambulance wagons in waiting. Two stretcher-bearers are trained in the use of disinfectants. The senior sister supervises the refreshment service, keeps the accounts, and details the lady helpers'

duties. The lady helpers are all educated women; they help to feed, wash, etc., the lying-down cases in the trains; others assist the medical officer with the dressings. They also help patients with their letter writing, etc., and assist in the preparation of the night quarters. The house-keeper looks after the kitchen and her subordinates, and sees to the preparing of hot drinks, sandwiches, etc. A small reserve personnel is advisable to fill gaps in case of sickness, etc., of the staff. They might come in useful to fill up casualties amongst the personnel of the trains. When not wanted for these services they can be employed at the general hospital. The rest and dressing stations cannot count on assistance from the personnel of the auxiliary hospital trains, as they themselves have many tidying-up duties to do, and at the same time have to get their own meals.

Occasional additional duties.—In auxiliary hospital trains there is not much room between stretchers, and the men on the bottom stretchers cannot sit up. If the medical officer in charge of the train wishes to make patients change places at rest and dressing stations the voluntary aid detachment render assistance. Some of the fixing straps for the suspension apparatus may become damaged. Spare straps are to be kept at rest and dressing stations for replacing damaged ones. Straw in sacks is to be kept to help to make cases in the passenger trains, who may require to lie down for a time, more comfortable. The S.M.O. may have to supply spare equipment or dressings to hospital trains passing through. He obtains receipts for anything issued.

The S.M.O. of the rest and dressing station gives advice regarding the sanitary cleanliness of the station, removal of food remains and dirty water, disinfection of latrines, etc. If patients foul the ground by vomiting or otherwise, the ground must be disinfected. Special cleanliness in the dressing-room is necessary. This sanitary work is usually done by the personnel of rest and dressing stations. Any infectious case found in the train is removed, isolated, and transferred to the general hospital before he gets any food or personal attention. The contacts in the same carriage are usually allowed to continue their journey. They remain, of course, in isolation under observation. The medical officer uses his common sense in taking whatever precautionary measures may appear indicated.

Doctors, if not entitled to wear uniform, wear the dress of the V.A.D. Stretcher-bearers wear a cap, frock, and dark-coloured trousers. They also have a canvas suit and, if possible, a great-coat. The senior sister and lady helpers wear a prescribed uniform. The kitchen hands are provided by the Red Cross Society with two white and two coloured aprons. Where no suitable buildings are available, and the personnel have to work in the open, the society provides them with some form of slip-on cape. It is suggested that stretcher-bearers and lady helpers working in the refreshment department should wear a number corresponding with that of the table they serve.

#### *C.—Arrangements for Feeding.*

According to regulations, the sick and wounded transport detachment report to the lines of communication authorities the amount and kind of food required for auxiliary hospital train convoys. The lines of

communication authorities transmit the information to the railway station commander, who passes the duty on to the rest and dressing stations, and the S.M.O. gives the senior sister the necessary details.

As the time for distribution of the food, and for its consumption, is very limited, it is essential that the food be served in as simple a manner as possible; it should be the same for officers as for men. About a quart per head of thick vegetable soup, with meat cut up small, is recommended. A lighter soup may be prepared for the more delicate invalids. Sometimes, for a change, meat and vegetables may be issued. The equivalent of the soldier's full ration is insisted on. It is recommended that a supply of desiccated soups be kept for emergencies. Refreshments include milk, coffee, tea, and syrups. These are distributed in mugs with handles. Stimulants are issued only by order of the medical officer.

As a rule, sufficient bread or biscuit for the journey is placed on the train. If there is a shortage, the O.C. train reports to the O.C. railway station, who orders the required supply to be furnished further down the line. Rest and dressing stations, in addition, issue a ration of bread with the soup, and also meat sandwiches done up in paper for consumption on the onward journey.

Kitchen arrangements must be made, the details depending on local conditions. If there is a big kitchen near at hand it may be used, and the soup is transferred when required to large receptacles, in which, of course, it must be possible to keep the soup hot. A travelling kitchen, if available, would be very useful. Besides the patients, the attendants and train staff have to be fed, which means that the kitchen capacity must be for 375 persons for auxiliary hospital trains, or 875 for passenger trains. It must be borne in mind that a second train may arrive thirty minutes after the first one leaves.

A good water supply is essential, and expense in laying on water should not be spared if satisfactory arrangements do not already exist. Arrangements should be made to have taps and washing-places along the platform to allow the train personnel to do washing up, etc., and for the patients to wash their hands. If the drinking water is doubtful in quality a supply of boiled water must be arranged for. A supply of drinking water for the patients should be placed in jugs, &c., on the tables. Patients should not be allowed to make use of the public taps at the station. Arrangements for the men to dip their mugs in large receptacles should not be countenanced. Large cans should be in readiness to refill the water receptacles in the railway carriages.

#### *D.—Notes on Sick and Wounded.*

Dress.—Equipment and ammunition are generally removed at the dressing station. The patient usually retains his great-coat, haversack, and drinking mug.

The railway carriages should all be numbered 1, 2, 3, etc., starting from the engine: the sick should know the number of their carriages. Patients are to be warned that when they get out at rest and dressing stations they should take their haversack and cup with them, and make for the table with the number corresponding to that of their carriage, and that they will find drinking water on the table. They should further be advised to make use of the w.c. on the train before arrival, so as not to lose time at the station.

It occasionally happens that a patient has to be taken out of the train for immediate operation: it will then be usual to transfer him to the local hospital. A certain number of cases may require re-dressing. The following are the only cases to be taken out of auxiliary hospital trains: (1) Cases unfit for further transport. (2) Cases requiring re-dressing. (3) Cases requiring immediate operation. (4) Cases suffering from infectious disease or suspected of it. (5) Special cases requiring special treatment, for which the station is particularly adapted. Patients dying *en route* can be put out of the train at any station where the train stops.

*E.—Measures to be taken to ensure Smooth Running at Rest and Dressing Stations.*

Nearly 900 men from a passenger train will have to be catered for at the same time. They must be divided into groups, and room must be left for stretcher parties to move about. No shouting or unnecessary talking is to be allowed. Everything must be run in perfect order, as a second train-load may arrive half an hour later. The O.C. railway station finds the necessary pickets to keep the station clear of intruders.

Experience has shown that the best results are obtained by having one table to two railway carriages of sick. It will be known where the first carriage will pull up, and the tables can be placed at intervals accordingly. Twenty tables for a full train of forty carriages are required. Tables should be 6 ft. long and 3 ft. broad. Affixed to each table should be the numbers of the two carriages it is to supply. If no head cover already exists, a tarpaulin awning should be stretched over the table for protection against bad weather. Near each table should be a double bench, with a back, which can seat ten people; these are for patients not able to stand. If the weather is very bad, or there is no head cover, the food must be distributed in the carriages. Tables and benches must be far enough away from the train to allow stretcher parties to pass, and also to allow men from the passenger train who desire medical attendance to fall in in two ranks.

Sign-posts to the dressing tent and latrines are to be erected. At stations with low platforms, wooden steps are to be made for placing against the doors of carriages to allow patients to get down easily. When patients are removed from the train on stretchers for transfer to hospital, an equivalent number of empty stretchers must be put on the train out of the rest and dressing station supply. Wheeled stretchers and ambulance wagons for transferring cases to hospital should be waiting at the station. As soon as the patients have finished their meal, the plates and other utensils should be collected and placed in small wheeled carriers and wheeled to the washing-up place. Four carriers are enough for twenty tables. Orderlies employed in the refreshment department must be detailed beforehand to carry out this duty.

The importance of the soup and warm food being served at the right temperature is emphasized. In the case of auxiliary hospital trains, or when there is no time for the patients to get out, the distribution of the food on the train can be completed in a few minutes if properly organized. If the rest and dressing station has a double outfit of plates, mugs, etc., the train can proceed on its way in the event of it having

to make up lost time, and the crockery sent back from the next halting place. It is noted that lying-down cases may have considerable difficulty in eating with a spoon while the train is moving, but this is better than that they should have no food at all. It is suggested that for such cases small quantities at a time be poured into the soup basins to prevent spilling.

Whether cases for removal from the train to the dressing station or to the hospital should be taken out before or after the food is distributed must depend on circumstances, such as the number of cases for removal, the time at disposal, etc. No definite rules for the removal of these cases can be laid down, as different varieties of wagons and apparatus will be in use, and bearers must use their common sense.

Returning of plates, cups, etc.—It is considered that it will not often happen that there is only time to put the food on the train as mentioned above. The O.C. of the train is responsible that all utensils placed in the train are returned to the tables from which they were issued. Utensils should only be allowed to remain in the train in cases of necessity. The table attendants must at once report deficiencies to the senior sister, stating in which carriage the articles had been left, and the O.C. railway station should telegraph ahead to have the missing articles returned. In spite of this, occasional losses must be expected, and be met from a reserve.

Accounts.—The local societies equipping the rest and dressing station should give the medical officer a money advance to meet necessary current expenses. The book-keeping should be handed over to the senior sister. The price of the warm food and the light refreshments at the various rest and dressing stations can soon be worked out; it will vary with local market prices. The warm food and the light refreshments appear to be accounted for separately in the books. If the local society has undertaken rationing, they will be reimbursed by the officer in charge of supplies, correspondence being conducted through the territorial delegate. The medical officer in charge of the hospital train gives receipts for food supplied to his patients.

The arrangements above described also hold good in principle for sick and wounded convoys proceeding by water-ways. The arrangements to be made at the landing-stages will depend on the formation of the river banks or quays, and on facilities in the way of cranes and donkey engines available for unloading the wounded.

#### *F.—Mobilization Preparations and Instruction of the Personnel in their Duties.*

The territorial delegate informs the president of the local societies of the number of rest and dressing stations that will be required in his district. He then selects points of concentration, preferably at big railway centres, from which the rest and dressing station units may be sent on receiving orders to form a rest and dressing station. The distance between rest and dressing stations should be about seven to eight hours by rail (at 22½ kilometres per hour). A smaller number of rest and dressing stations with well-trained attendants is better than a larger number with an inferiorly trained personnel. The personnel with its equipment should be got together, and be ready to move at a moment's notice to any station allotted.



Lists of the personnel for rest and dressing stations are kept by voluntary aid societies in peace time. Allowance should be made for 50 per cent of casualties on mobilization. The territorial delegate calls for the nominal rolls of the personnel detailed for the rest and dressing stations which are held in readiness. The appointment of the two doctors has to be approved by the War Office. The senior sister and the senior stretcher-bearer must be familiar with the regulations in peace time.

The prescribed medical and surgical equipment must be suitably packed, and arrangements made for the packing of the rest of the equipment to be acquired on mobilization. Lists are to be made of all material already in possession, and of equipment for which provision has been arranged with merchant houses. These lists are passed from the president of local voluntary aid societies to the territorial delegate, who transmits them to the military authorities so that they may know for what deficiencies they have to provide.

How soon the services of the rest and dressing station parties will be required after mobilization cannot be stated in advance. No time, however, should be lost in completing the training of the personnel in their duties, and this can often best be done by employing them in the hospitals at the places at which they concentrate until their services are actually required.

Practice parades in peace time are required to be as realistic as possible. They should be carried out by rest and dressing station units allotted for actual employment. The important part of the exercise is testing the details of the organization, and is thus of chief importance to the S.M.O., the senior sister, and the senior stretcher-bearer. It is most important to carry out the exercise with an officer acting as O.C. railway station. As it is not easy to arrange a number of these practices, members of other rest and dressing stations should be allowed to attend as spectators, but on no account to take actual part in the exercise, as the practice must be done with the fixed establishment. Practice parades on a smaller scale should also, of course, be carried out, and much can be taught and learnt without expenditure of money. Stretcher-bearers should be exercised in the loading and unloading of wounded. As there are several different kinds of railway wagons and river barges which will be used during war, practices should be made with all these varieties of conveyance to gain the necessary experience. Mention is also made of practising removal of railway fencing and railings, repairing broken stretchers and stretcher-carrying apparatus, and training in disinfection. The rest of the instruction must be based on lines which will enable the detachments to carry out the various duties referred to in the preceding paragraphs, and of which detailed accounts are given in the instructional books issued by the Red Cross Society.

In the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for November, 1913, p. 624, a description is given of a practice parade of a rest and dressing station, based on these regulations. J. V. F.

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OF "THE JOURNAL OF THE ROYAL ARMY M

on my turn, be permitted to reply to Mr.

commencement of the labour being

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like to quote some statistics for the

1 1 1 1 3 1 1 1 1

(1) Average annual strength of officers serving in the three Bush Stations, Port Lokko, Mabantah and Wongkufu .. .. .	16
Number of admissions to hospital of above officers, all diseases ..	49
"          "          "          "          "          from malaria ..	34

(2) Average annual strength .. .. .	8
Number of admissions to hospital, all diseases .. .. .	25
"    "    "    from malaria .. .. .	23

Since my arrival at Freetown, on July 9, 1913, five British officers in the command have died. By the irony of circumstances the obituary notice of the late Captain Farrant, R.A.M.C., occurs in the same issue of the Journal as that containing the "comment" to which I take exception.

Enteric fever, formerly I believe unknown here, has now made its appearance, causing one of the deaths above mentioned. Three medical officers, including myself, were on the sick list during the month of March, 1914, suffering from diseases directly attributable to this climate.

All of which goes to show that the old adage "Truth is stranger than fiction" still holds good. Major Powell's airy criticism of my "Notes," and his patronizing advice to those serving here, based on hazy recollections of his experience some five years ago, are neither applicable to, nor appreciated by, officers doing duty on the West Coast of Africa.

*Wilberforce,  
West Africa,  
April 27, 1914.*

I am, etc.,  
 ROBERT R. LEWIS,  
*Captain, R.A.M.C.*

## OUR BADGE.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Colonel Clark, in his interesting article on "Our Badge," has dismissed the sign at the commencement of a prescription with the remark that it "was for long placed at the head of prescriptions." I think I can contribute a little more information regarding this.

The Æsculapian staff and snake of the pagan age came in time to be symbolized by a modification of the original sign, by the letter R, either single or reduplicated. The suggestion of the letter R may have been accidental or intended, but for centuries, since the Christian Era, the sign was not mythological or pagan, but a Latin expression.

The initial sign of prescriptions, till the practical Recipe became the vogue was expressed in a fashion R or R<sub>1</sub> (reduplication) and occasionally R.R. These letters stand for *Raphælis Responsus* or the answer of the presiding archangel over medicine.

It would therefore seem to represent the transitional stage between the mystic staff of Æsculapius and the modern imperative.

I am, etc.,

Scarborough,  
May 21, 1914.

W. A. MORRIS,  
*Lieut.-Col., R.A.M.C.*  
(Retired Pay.)

## PREVENTION OF MALARIA—AN AMPLIFICATION.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

DEAR SIR,—To my mind the letter on "Prevention of Malaria—A Suggestion" in the April number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is calculated to convey to persons who are not familiar with Indian conditions a false impression of the way in which malaria is combated in India. I can only speak for the 5th (Mhow) Division, but the measures adopted there are as follows:—

(a) For every man who has had malaria, a malaria case sheet is made out, in which all details of the disease and treatment are entered.

(b) Every man who has had malaria is detained in hospital till all parasites have disappeared from his blood. This is verified in the divisional or brigade laboratories as well as by the officer in charge of the case. On leaving hospital he is subjected to four months' quinine treatment in barracks. He should also have his blood examined, weekly during this period.

(c) In Jubbulpore mosquito nets have been provided by Government for two heavily infected units, but it is found possible to induce other units to provide nets from their own funds for men under treatment. Men known to be infected are not allowed in the barrack-rooms, but are isolated in special wards in hospital until the parasites have disappeared from the blood.

The conditions as regards malarial infection, peculiar to this portion of India are :—

(a) Malaria starts in July (the rains), is on the increase until September, and then decreases to vanishing point in December and January. This corresponds with the appearance of the anopheline carriers of malaria which begin to appear at the end of June, depending on the rains and gradually disappearing at the end of October. The cases of malaria appearing in the cold weather are probably relapses due to cold or manœuvres.

(b) Most cantonments have native villages in or around them, within easy reach of mosquitoes assisted by a little wind. These villages contain infected children and adults, and as anophelines are invariably bred in the village they are a far more potent source of infection than one or two possible carriers among the soldiers in barracks. This is easily demonstrated by using spot maps of malaria cases.

The suggestion contained in the letter quoted could therefore be amplified as follows :—

(a) From the end of June till the end of October provide *all* men with nets. The men will use them in the rains, when the temperature is comparatively low, but cannot be induced to employ them in the hot weather. Wear and tear of nets might be saved for the rest of the year, though culicides abound in the cold weather.

(b) Take measures to treat the chief source of the disease, the native population, by quinine and by the prevention of mosquitoes breeding.

(c) Deal with all water collections in cantonment. This is nearly impossible in the rains; but the draining, oiling, and filling up of holes in the ground and in trees does a certain amount of good. We are proposing to experiment with V-shaped concrete or stone drains, a foot high, at the bottom of all small nullahs, and if successful, to allocate a sum of money yearly for the gradual extension of these drains. Water oozing from the soaked ground in the nullahs keeps small depressions full of water, and it is in these that we get most of our malaria carrying anophelines. It is hoped that the mere pointing of the bottom of the nullah with concrete will prevent the scouring out of the drain and will carry off the water.

(d) Deal with all soldier carriers as above indicated. Besides the

microscopic tests, both thick and thin films, the urobilin test (Dr. Atkinson, *Lancet*, June 28, 1913) is also on trial this year and should prove a valuable indicator in certain cases, besides being within easy reach of any medical officer.

I hope I have not taken up too much of your valuable space, but I could not let any one imagine that we are in quite as backward a state as the letter quoted would suggest, and I have tried to put very briefly the chief ways in which we are dealing with malaria. I regret to say that for some reason or another we have not had much success with quinine used prophylactically.

I am, etc.,

C. F. WANHILL,

*Major, R.A.M.C.*

*Mhow.*



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# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

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## Corps News.

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JANUARY, 1914.

### ARMY MEDICAL SERVICE.

Colonel Walter G. A. Bedford, C.M.G., M.B., from the half-pay list, is restored to the Establishment, *vice* H. S. McGill, to the half-pay list, dated December 4, 1913.

Colonel Harry S. McGill is placed temporarily on the half-pay list on account of ill-health, dated December 4, 1913.

### ROYAL ARMY MEDICAL CORPS.

Major James E. Carter, M.B., is placed on retired pay, dated December 2, 1913.

Major Thomas C. MacKenzie, D.S.O., is appointed a Deputy Assistant Director of Medical Services of a Territorial Division, dated November 5, 1913.

Supernumerary Major David Harvey, M.D., is restored to the establishment, dated December 1, 1913.

Captain William George Maydon, M.B., to be an Adjutant of a School of Instruction, T.F., *vice* Major William M. H. Spiller, M.B., who vacates that appointment, dated November 12, 1913.

**ARRIVALS HOME FOR DUTY.**—From India: on November 28, Lieutenant-Colonel D. D. Shanahan, Majors R. W. Clements and J. D. G. Macpherson, Captains M. J. Lochrin, E. M. Middleton, and A. W. Howlett; on December 9, Majors F. E. Gunter and J. H. Barbour, Captains R. G. H. Tate and T. H. Scott. From Malta: on December 15, Major M. H. Babington. From Straits Settlements: on December 17, Major H. G. Pinches. From Egypt: on December 17, Captain D. Ahern. From Ceylon: on December 17, Captain F. Worthington.

**ARRIVALS HOME ON LEAVE.**—Captains A. H. Heslop, E. D. Caddell and W. J. Tobin.

**POSTINGS.**—Northern Command: Captain T. H. Scott. Aldershot: Captains M. J. Lochrin and A. W. Howlett. Western Command: Captain A. C. Amy. Eastern Command: Lieutenant-Colonel D. D. Shanahan, Captains E. M. Middleton and F. Worthington. Irish Command: Majors S. A. Archer, R. W. Clements and H. G. Pinches, Captains D. Ahern, R. G. H. Tate and W. E. Marshall. London District: Majors M. H. Babington and J. H. Barbour. Royal Army Medical College: Major D. Harvey.

**TRANSFERS.**—To Woolwich: Lieutenant-Colonel C. W. R. Healey, from London; to Aldershot: Major G. A. Moore, from Chatham, Capt. H. St. M. Carter, from Netley; to the Royal Arsenal, Woolwich: Major P. S. O'Reilly, from Gravesend.

**TRANSFERS TO THE HOME ESTABLISHMENT.**—From India, on December 16, Major S. A. Archer; on January 19, Captain A. C. Amy; on January 23, Captain E. D. Caddell. From Hong Kong, on December 17, Major F. S. Penny.

**APPOINTMENTS.**—Colonel W. G. A. Bedford, C.M.G., D.D.M.S., South Africa. Lieutenant-Colonel C. W. R. Healey, charge of the Medical Division, Royal Herbert Hospital, Woolwich. Lieutenant-Colonel G. A. T. Bray, Deputy Surgeon, Royal Hospital, Chelsea. Lieutenant-Colonel D. D. Shanahan, D.A.D.M.S., Eastern Command. Major G. A. Moore, Specialist in Otolaryngology, Cambridge Hospital, Aldershot. Major W. S. Harrison, Sanitary Officer, Jamaica. Major E. W. W. Cochrane, Clinical Pathologist, Cambridge Hospital, Aldershot (temporary). Major D. Harvey, Clinical Pathologist, Royal Army Medical College. Major M. H. Babington, Clinical Pathologist, Queen Alexandra Military Hospital, London. Major P. S. O'Reilly, Medical Officer, Royal Arsenal, Woolwich. Major W. M. Power, charge of the Military Families Hospital, Chatham. Major R. V. Cowey, Specialist in Midwifery and Gynaecology, Bulford. Major J. H. Barbour, Medical Examiner of Recruits, London Recruiting Area. Captain J. H. Douglass, Sanitary Officer, West Africa. Captain H. St. M. Carter, Specialist in Operative Surgery, Cambridge Hospital, Aldershot.

**QUALIFICATION.**—Captain A. C. Amy has obtained the degree of M.D. of the University of Glasgow.

**ROSTER FOR SERVICE ABROAD.**—Major L. Humphry has exchanged to a higher position on the roster with Major A. W. Hooper, D.S.O. Quartermaster and Honorary Captain A. J. Chalk has exchanged to the home roster with Quartermaster and Honorary Lieutenant R. H. Green.

**EMBARKATIONS.**—For South Africa : on December 6, Colonel W. G. A. Bedford, C.M.G. For India : on December 11, Majors E. H. Condon and B. W. Longhurst. Captains L. Cotterill and R. E. Humfrey. Lieutenants B. H. H. Spence, H. S. Blackmore, D. W. Bruce and E. P. A. Smith ; on December 19, Majors L. Addams-Williams, H. D. Packer and W. M. H. Spiller, Captain T. S. Coates, Lieutenants P. A. With and S. J. Barry ; on December 23 (at Gibraltar) Captain T. H. Dickson ; on December 29 (at Port Said), Lieutenant C. J. H. Little. For Jamaica : on December 31, Major W. S. Harrison and Lieutenant I. R. Huddleston.

### ROSTER FOR SERVICE ABROAD.

In forwarding the roster for service abroad, which is printed below, the following has been communicated by the Director-General :—

(a) The names of officers holding appointments for fixed periods are printed in italics with date of expiration of the same, except in the case of appointments which expire during the trooping season 1914-15, which are shown in ordinary type.

(b) Officers who retire in 1914 are omitted, also those holding gazetted appointments the dates of which are shown in the Army List (except in the case of appointments terminating during the trooping season 1914-15).

(c) Officers should bear in mind, when calculating their positions in regard to their next tour abroad, that casualties owing to promotions, &c., affect their places on the roster, that on promotion their *date* on the roster of the higher rank will be the same as that they occupied on the roster of their former rank, and that the period of service at home in the several ranks is not of equal duration.

### LIEUTENANT-COLONELS.

Leishman, Sir W. B., Bt. Col., Kt.  
(31.1.14), Professor R.A.M. Coll.  
Burtchaell, C. H. (1.6.14), War Office.  
Horrocks, W. H., Bt. Col. (17.9.14), Mem.  
Advisory Board.  
Scott, B. H. (1.5.14), War Office.  
Russell, J. J. (1.11.14), D.A.D.M.S.  
Southern Com.  
Moore, S. G. (2.4.14), D.A.D.M.S.  
Aldershot Com.  
Kennedy, A. (14.1.15), D Block, Netley.  
Austin, J. H. E.  
Morgan, J. C.  
O'Hallorau, M.

Le Quesne, F. S., V.C.  
Haines, H. A.  
O'Callaghan, D. M.  
Newland, F. R.  
Dalton, C. (1.6.14), D.A.D.M.S. Irish  
Com.  
Rowan, H. D.  
Elkington, H. P. G.  
Gibbard, T. W. (2.4.14), Lecturer R.A.M.  
Coll.  
Swan, W. T.  
Daly, J. H.  
Rawnsley, G. T. (1.11.14.), D.A.D.M.S.  
T.F.

Gordon, P. C. H.  
 Pilcher, E. M., D.S.O. (1.8.14), Professor  
 R.A.M. Coll.  
 Ferguson, N. C., C.M.G.  
 Cree, G.  
 Berryman, W. E.  
 McLoughlin, G. S., D.S.O.  
 Winter, T. B.  
 Macdonald, S.  
 Young, C. A. (1.4.14), D.A.D.M.S. T.F.  
 Clark, S. F.  
 Forde, B.  
 Meek, J.  
 Stone, C. A.  
 Jameson, J. O.  
 Starr, W. H.  
 McCulloch, T.  
 Thurston, H. C., C.M.G. (24.1.14), R.  
 Mil. Coll., Sandhurst.

Macleod, R. L. R.  
 Melville, C. H., Bt. Col.  
 Yarr, M. T.  
 Hickson, S., *K.H.S.*, Bt. Col.  
 Nash, L. T. M.  
 Bate, A. L. F.  
 Copeland, R. J.  
 Daly, T.  
 Brown, H. H.  
 Green, J. S.  
 Bewley, A. W. (1.4.17), D.A.D.M.S.  
*Northern Com.*  
 Barefoot, G. H.  
 Caldwell, R.  
 Bullen, J. W.  
 Girvin, J.  
 Healey, C. W. R.  
 Shanahan, D. D.

## MAJORS.

Fitzgerald, F. G. (12.7.14), D. of Y.  
 School.  
 McLeunan, F. (1.11.14), Adj. T.F.  
 Winder, J. H. R. (1.4.14), Fams. Alder-  
 shot.  
 Hyde, D. O. (1.4.14), D.A.D.M.S.T.F.  
 Profeit, C. W.  
 Mitchell, L. A.  
 Smith, S. B. (22.9.14), San. Off., Irish  
 Com.  
 Tyacke, N.  
 Humphry, L.  
 Jones, T. P.  
 Silver, J. P.  
 Carr, C. H.  
 Curme, D. E.  
 Martin, J. F.  
 Prescott, J. J. W., D.S.O.  
 Henderson, P. H.  
 Woodley, R. N. (1.11.14), Adj. T.F.  
 Waring, A. H.  
 Walker, F. S.  
 Knox, E. B.  
 Steele, W. L.  
 Harding, D. L.  
 Beatty, M. C.  
 Greenwood, A. R.  
 Myles, C. D.  
 Fairrie, S. H.  
 Thurston, H. S.  
 Moore, G. A.  
 Mitchell, A. H. McN.  
 Bostock, J. S.  
 Lauder, F. P.  
 Langstaff, J. W.  
 Milner, A. E.  
 Birrell, E. T. F.  
 Fry, W. B.  
 Cowey, R. V.  
 Ward, W. A.  
 Brakenridge, F. J.  
 Pollock, C. E.

Evans, P.  
 Master, A. E.  
 Morgan, C. K. (29.10.14), Training Est.,  
 Aldershot.  
 Anderson, H. S.  
 Irvine, F. S.  
 Winslow, L. F. F.  
 Fielding, T. E.  
 Wroughton, A. O. B.  
 Harrison, L. W.  
 Boyle, M.  
 Hudleston, W. E.  
 Kiddle, F.  
 Hewetson, H.  
 Hayes, E. C.  
 Collingwood, P. H.  
 Hodgson, J. E.  
 Archer, G. J. S.  
 Buist, J. M.  
 Brunskill, J. H. (10.12.15), San. Offi.  
*Irish Com.*  
 Rattray, M. M.  
 Biggam, T.  
 Hull, A. J.  
 Anderson, J. B. (10.11.14), Embarkation  
 M.O., Southampton.  
 Riach, W.  
 Grech, J.  
 Maurice, G. T. K.  
 Foulds, M. F.  
 Martin, C. B.  
 Parsons, A. R. C.  
 Cuthbert, J. M.  
 Lauder, T. C.  
 Fawcett, R. F. M.  
 Goddard, G. H.  
 Ryan, F. (1.10.15), Fams. Hosp., Alder-  
 shot.  
 McDermott, T.  
 McMunn, J. R.  
 Howell, H. A. L.  
 Prynne, H. V. (24.12.14), R. Mil. Acad.

Clarke, J. B.  
 Probyn, P. J., D.S.O.  
 MacCarthy, I. A. O.  
 Campbell, J. H., D.S.O.  
 Bateman, H. R.  
 Hinge, H. A.  
 Fuhr, R. S. H., D.S.O. (23.4.16), R.  
*Arsenal, Woolwich.*  
 Crawford, G. S.  
 Thomson, C. G.  
 LLoyd, L. N., D.S.O.  
 Gallie, J. S.  
 Marriott, W. E. P. V.  
 Goodwin, T. H. J. C., D.S.O.  
 Morphew, E. M.  
 Powell, E. W.  
 Taylor, H. S.  
 MacDougall, A. J.  
 Symons, F. A.  
 Fox, A. C.  
 Chopping, A. (17.5.16), Registrar,  
*Netley.*  
 McNaught, J. G.  
 Adye-Curran, W. J. P.  
 MacKessack, P. (1.3.15), San. Offi.,  
*Eastern Com.*  
 Richards, F. G.  
 Falkner, P. H.  
 Dunn, H. N.  
 Smithson, A. E.  
 Martin, H. G.  
 Ensor, H., D.S.O. (1.10.15), Registrar,  
*R. Herb. Hosp.*  
 Long, H. W.  
 Lelan, P. S. (10.10.15), San. Offi.,  
*Eastern Com.*  
 O'Grady, S. de C.  
 Hooper, A. W., D.S.O.  
 Norman, H. H.  
 Leake, J. W.

Webb, A. L. A. (15.3.16), San. Offi., Scot-  
*tish Com.*  
 Riddick, G. B.  
 Barnett, K. B.  
 Corkery, M. P.  
 Ritchie, T. F.  
 Lawson, C. B.  
 Waring, A. D.  
 Dennis, B. R.  
 Steel, E. B.  
 Butler, S. G.  
 Cochrane, E. W. W.  
 Bennett, W. L.  
 McDonnell, E.  
 Power, W. M. (1.1.17), Fam. Hosp.,  
*Chatham.*  
 Bourke, E. A.  
 Siberry, E. W.  
 Kelly, J. F. M.  
 Poe, J.  
 Baillie, G.  
 Burke, B. B.  
 Rutherford, N. J. C. (27.9.16) San. Offi.,  
*Cork.*  
 Irwin, A. W. A.  
 Morton, H. M.  
 Sweetnam, S. W.  
 Gwynn, W. P.  
 Watts, B.  
 Herrick, H.  
 O'Reilly, P. S. (18.12.16), R. Arsenal,  
*Woolwich.*  
 Wingate, B. F.  
 Slayter, E. W.  
 Clements, R. W.  
 Macpherson, J. D. G.  
 Gunter, F. E.  
 Barbour, J. H.  
 Babington, M. H.  
 Archer, S. A.  
 Pinches, H. G.

## CAPTAINS.

Conway, J. M. H. (1.11.14), Adj. T.F.  
 Ainsworth, R. B. (1.4.14), San. Offi.,  
*Southern Com.*  
 Balck, C. A. J. A.  
 Tyndale, W. F., C.M.G. (28.9.14), San.  
*Offi., Southern Com.*  
 Bridges, R. H. (1.11.14), Adj. T.F.  
*Wilmot, R. C. (21.9.16), Hythe.*  
 Kelly, H. B. (1.10.14), Fam. Hosp.,  
*Curragh.*  
 Nolan, R. H.  
 Buchanan, R. J. B.  
 Crawford, J. M. M. (1.11.14), Adj. T.F.  
 Bramhall, C. (1.11.14), Adj. T.F.  
 Davidson, P., D.S.O. (10.1.15), Adj.  
*Depot.*  
 Fawcett, H. H. J. (19.10.14), Adj. T.F.  
 Sylvester Bradley, C. R. (1.11.14), Adj.  
*T.F.*  
 Lewis, S. E. (1.12.14), Families Hos-  
*pital, Devonport.*

Storrs, R.  
 Emerson, H. H. A. (1.11.14), Adj. T.F.  
 Grant, M. F. (1.11.14), Adj. T.F.  
 Hole, R. B. (1.11.14), Adj. T.F.  
 Harding, H.  
 Richmond, J. D.  
 Reed, G. A. K. H. (10.1.15), Depot.  
 Meadows, S. M. W. (1.1.15), Families  
*Hospital, Tidworth*  
 Richard, G. H.  
 Rose, A. M.  
 Leahy, M. P.  
 Glanvill, E. M.  
 Hanafin, P. J.  
 Otway, A. L.  
 Osburn, A. C.  
 Hildreth, H. C. (10.9.15), Fam. Hosp.,  
*Fermoy.*  
 Ommanney, F. M. M.  
 Collins, R. T.  
 Bevis, A. W.



Sinclair, M.  
 Douglass, J. H.  
 Moore, E. H. M.  
 Arthur, A. S.  
 Garland, F. J.  
 Easton, P. G. (1.8.14), *Fams.*, Aldershot.  
 McConaghy, W.  
 Carter, H. St. M.  
 Lloyd Jones, P. A.  
 Maughan, J. St. A.  
 Pascoe, J. S. (13.8.15), *Fam. Hosp.*, Woolwich.

Hallowes, R. C.  
 Gurley, J. H.  
 Cahill, R. J.  
 Dwyer, P.  
 Harvey, G. A. D.  
 Kempthorne, G. A.  
 Bowle, S. C.  
 Lithgow, E. G. R.  
 Lynch, J. P.  
 Turner, C. H.  
 Elliot, E. J.  
 Sutcliff, A. A.  
 Thurston, L. V.  
 Wilson, H. T.  
 Ellis, W. F.  
 Gater, A. W.  
 Booth, E. B.  
 White, R. K. (1.10.15), *Fam.*, Aldershot.  
 Powell, J. E.  
 Ormrod, G.  
 Wetherell, M. C.  
 Brown, G. H. J.  
 Beadnell, H. O. M.  
 Moss, E. L. (6.10.16), *Fam. Hosp.*, Portsmouth.

Gibbon, T. H.  
 Hoar, J. E.  
 O'Brien, C. W.  
 Rahilly, J. M. B.  
 Roberts, F. E.  
 Wiley, W.  
 Campbell, J. H.  
 Low, N.  
 Meaden, A. A.  
 Coppinger, C. J.  
 Cordner, R. H. L.  
 Hughes, G. W. G.  
 Ferguson, G. E.  
 Graham, J. H.  
 Fraser, A. D.  
 Seccombe, J. W. S.  
 Cromie, M. J.  
 Pallant, S. L.  
 Ware, G. W. W.  
 Symons, V. H.  
 Ievers, O. (2.1.17), *Fam. Hosp.*, Shorncliffe.  
 Carruthers, V. T.  
 Perry, H. M. J.  
 Sherren, H. G.  
 Kelly, C.  
 Lewis, R. P.

Foster, R. L. V.  
 White, C. F.  
 Edwards, G. B.  
 Bell, W. J. E.  
 Potts, E. T.  
 Sidgwick, H. C.  
 Benson, W. (11.11.16), *Co. Off.* Depot.  
 Nimmo, W. C.  
 Dunbar, B. H. V.  
 Sim, J. A. B.  
 Blackwell, T. S.  
 Sampson, F. C.  
 Scatchard, T.  
 Andrews, L. A. A.  
 Dill, M. G.  
 Bryden, R. A.  
 O'Carroll, A. D.  
 Tabuteau, G. G.  
 Weston, W. J.  
 Anderson, J. A.  
 Priestley, H. E.  
 Hastings, A. E. F.  
 Anthonisz, E. G.  
 Dunne, J. S.  
 Leslie, R. W. D.  
 Rees, G. H.  
 Painton, G. R.  
 Holden, C. W.  
 Bond, A. H.  
 Browne, C. G.  
 Gibson, H. G.  
 Grogan, J. B.  
 Jacob, A. H.  
 Smyth, R. S.  
 Smales, W. C.  
 O'Neill, E. M.  
 Churchill, G. B. F.  
 Scott, J. W. L.  
 Egan, W.  
 Davy, P. C. T.  
 Johnson, V. G.  
 Sampson, P.  
 Forrest, F.  
 McCammon, F. A.  
 Paine, E. W. M.  
 Stevenson, G. H.  
 Morris, C. R. M.  
 Williams, A. S.  
 Howell, F. D. G.  
 Forsyth, W. H.  
 Littlejohns, A. S.  
 Robinson, T. T. H.  
 Sexton, T. W. O.  
 De la Cour, G.  
 McQueen, C.  
 Vidal, A. C.  
 Irvine, A. E. S.  
 Stack, G. H.  
 Dawson, A.  
 Honeybourne, V. C.  
 Connell, H. B.  
 James, J.  
 Newman, R. E. U.  
 Moriarty, T. B.

Stewart, H.  
 Kavanagh, E. J.  
 Edmunds, C. T.  
 Fraser, A. E. G.  
 Harding, N. E. J.  
 Parkinson, G. S.  
 Pollard, A. M.  
 Millar, C. R.  
 Purdon, W. B.  
 Rudkin, G. F.  
 Cooke, O. C. P.  
 Langrishe, J. du P.  
 Thompson, W. I.  
 Bennett, J. A.  
 Bradish, F. L.  
 Bracken, G. P. A.

Johnson, B.  
 McEntire, J. T.  
 Wood, J. L.  
 Ryles, C.  
 O'Brien Butler, C. P.  
 O'Keeffe, J. J.  
 Browne, T. W.  
 Benett, A. M.  
 Ritchie, M. B. H.  
 Howlett, A. W.  
 Lochrin, M. J.  
 Middleton, E. M.  
 Scott, T. H.  
 Tate, R. G. H.  
 Worthington, F.  
 Ahern, D.

#### QUARTERMASTERS.

Hon. Lieut. E. J. Buckley (1.4.17), A.M.  
*Stores, Dublin.*  
 " J. T. Packard.  
 " Capt. H. W. Glover.  
 " " F. Crookes (1.1.15), A.M.  
*Stores, Woolwich.*  
 " " A. Lunney.  
 " " A. Wheeler.  
 " " J. Watkins.  
 " " H. P. Wakefield.  
 " " J. Gillman.  
 " " H. J. F. Audus.  
 " Lieut. J. Clark.  
 " " A. F. Tait.  
 " Capt. T. Exton.

Hon. Capt. A. J. Chalk.  
 " Major J. B. Short.  
 " Capt. A. Wilson.  
 " " W. N. Archibald.  
 " " H. Woolley.  
 " " G. F. Short.  
 " Lieut. T. D. Conway.  
 " Capt. R. R. Cowan.  
 " " H. Spackman.  
 " Lieut. J. W. Osborne.  
 " " R. N. Downing.  
 " Capt. E. P. Offord.  
 " Lieut. F. E. Collard.  
 " " E. V. Saunders.  
 " Capt. J. Attwood.

#### WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN. DISCHARGES.

11051	Qmr.-Serjt.	Williams, H.	..	8.12.13	Termination of second period.
9425	"	Hook, C. W.	..	15.12.13	After 3 months' notice.
10714	Serjeant ..	Kearns, T.	..	27.11.13	" " "
9878	" ..	Robinson, J.	..	6.12.13	Termination of second period.
5113	Private ..	Kirk, J. L.	..	15.11.13	Payment of £18.
4701	" ..	Watson, A.	..	25.11.13	" " "
7378	" ..	Ferguson, D.	..	1.12.13	" " £10.

#### TRANSFERS TO ARMY RESERVE.

5201	Pte.	Mungeam, H. J.	7.11.13	5306	Pte.	Marshall, H. C.	24.11.13
5208	"	Percival, T. P.	8.11.13	5210	"	Burke, S.	17.11.13
953	"	Ludlow, F. H.	12.11.13	5215	"	Herbert, W. A.	21.11.13
957	"	Hunt, H. A.	12.11.13	5218	"	Harding, H.E.B.	21.11.13
946	"	Legg, S.	11.11.13	5219	"	Read, G. H.	22.11.13
952	"	Cheese, F. W.	12.11.13	5220	"	Peacock, J.	22.11.13
5209	"	Stockley, E.	16.11.13	5217	"	Smith, W.	22.11.13
5212	"	Herbert, F.	16.11.13	5213	"	Dowthwaite, G.	17.11.13
956	"	Young, H.	12.11.13	5236	"	Welch, D.	12.12.13
5206	"	Pheasant, J.H.B.	13.11.13	5233	"	Parsons, W. S. F.	8.12.13
6443	"	Richards, C.	17.11.13	5230	"	Wright, C.	30.11.13
942	"	Crozier, W. E. A.	8.11.13	1041	"	Price, H. G.	3.11.13
969	"	McAllister, H. A.	18.11.13	1039	"	Hall, A. F.	3.12.13
940	"	Harris, W.	8.11.13	5221	"	Cole, W. E.	22.11.13
986	"	Godfrey, A. E.	20.11.13	5223	"	Joy, K. H.	29.11.13
989	"	Moore, R. S.	20.11.13	5227	"	Harding, A.	5.12.13
5205	"	Penson, H. G.	13.11.13				

### TRANSFERS TO OTHER CORPS.

17409	Serjeant ..	Kimberley, H. ..	22.11.13	To Defence Forces Un., S. Africa.
16231	" ..	Mason, H. B. ..	22.11.13	" " " " "
16165	" ..	Bullough, P. ..	22.11.13	" " " " "
19396	" ..	Baker, H. ..	22.11.13	" " " " "
12557	" ..	Harvey, P. ..	22.11.13	" " " " "

### TRANSFERS FROM OTHER CORPS.

11788	Serjeant ..	McDonald, D. ..	13.11.13	From 3rd Highland Bde. F. A., T.F.
7407	Private ..	Rich, C. ..	1.10.13	1st Welch Regiment.

### DEATHS.

6322	Private ..	Brown, E. J. ..	12.11.13	Bronchitis.
5982	" ..	Grey, W. ..	11.11.13	Tuberculosis (meningitis).
6783	" ..	Coleman, H. ..	8.12.13	Death from misadventure (fall- ing when jumping from a train whilst in motion).

### APPOINTED BUGLER.

6597	Boy ..	Fry, H. ..	3.12.13	Vice Taylor to the ranks.
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### THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

#### FOR STAFF-SERJEANT.

11211	Serjeant ..	Marsden, L. T.		
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#### FOR SERJEANT.

11437	Corporal ..	Beasley, J. W.	10887	Lce.-Serjt.	Humphrey, W. A.
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#### FOR CORPORAL.

1011	Private ..	Ross, H. O.	1611	Private ..	Hodson, P.
4870	" ..	Poules, S.	5242	" ..	Phipps, H. E.
1972	" ..	Davidson, B.			

### EMBARKATIONS FOR ABROAD.

TO SOUTH AFRICA, PER S.S. "GUILDFORD CASTLE," NOVEMBER 15, 1913.

186	Private ..	Fream, W.	5350	Private ..	Morris, G.
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TO SOUTH AFRICA, PER S.S. "BALMORAL CASTLE," NOVEMBER 22, 1913.

17409	Serjeant ..	Kimberley, H.	16231	Serjeant ..	Mason, H. B.
16165	" ..	Bullough, P.	19396	" ..	Baker, H.
12557	" ..	Harvey, P.			

### DISSEMBARKATIONS FROM ABROAD.

FROM EGYPT, PER H.T. "PLASSY," NOVEMBER 28, 1913.

2027	Private ..	Coney, E. H.	1102	Private ..	Hake, J. G.
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Cr.

## R.A.M.C. CAMP MESS, LONGMOOR.

Dr.

MESSING ACCOUNT.		1913	
	£ s. d.		£ s. d.
1913		April 30	213 3 7
By Receipts, Messing, &c.	352 0 0	to	21 19 6
" " Wines, Spirits and Tobacco	83 10 6	June 26	29 0 0
" " Rebate 10 per cent Canteen and Mess	9 5 0		73 7 1
			35 4 6
			6 0 0
			8 7 4
			57 13 6
			<u>£444 15 6</u>
TENT FURNITURE ACCOUNT.			
By Receipts from Officers, Hire of Tent Furniture	40 14 3	To Messrs. Solomon, Bros., Hire of Furniture, Replacements, &c.	40 17 9
Balance Dr.	0 3 6		<u>£40 17 9</u>
	<u>£40 17 9</u>		
WAGES AND GROOMS ACCOUNT.			
By Receipts from Officers	14 2 6	To Grooms, A.S.C. and 15th Hussars	14 2 6
GRATUITIES TO SERVANTS ACCOUNT.			
By Receipts from Officers	9 15 0	To Servants	9 15 0
HIRE OF TEA SET.			
By Receipts from Officers	1 10 0	To Canteen and Mess Co-op. Society	1 10 4
Balance Dr.	0 0 4		<u>£1 10 4</u>
	<u>£1 10 4</u>		
BALANCE SHEET.			
By Balance Messing Account	57 13 6	To Balance Tent Furniture	0 3 6
		" Hire of Tea Sets	0 0 4
		" Cheque Book	0 4 2
		" Balance Cr. at Bank	57 5 6
	<u>£57 13 6</u>		<u>£57 13 6</u>

Audited and found correct.

(Signed)

H. A. HINGE, Major R.A.M.C., President.  
 L. V. THURSTON, Captain R.A.M.C. } Members.  
 G. ORMIEROD, Captain R.A.M.C. }  
 W. F. ELLIS, Captain R.A.M.C., Mess Secretary.

August 27, 1913.

**NOTES FROM ALDERSHOT.**—Captain Ellis writes, December 10, 1913: "I have been asked by Lieutenant-Colonel Sutton, D.S.O., to send the enclosed copy of the balance sheet of the Officers' Mess, Longmoor Camp of Instruction. It was thought that officers who had been members of that mess would like to know how the accounts stood. The balance credit of £57 5s. 6d. has been placed in a separate account, 'The Royal Army Medical Corps Camp Mess Account,' to be used for any future mess on the lines of last year. There will probably be a meeting of the Aldershot Mess to determine the exact scope of this fund, but it will in no case be merged into the accounts of the permanent Royal Army Medical Corps Mess at Aldershot."

**NOTES FROM SIMLA.**—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant Director of Medical Services (British Service) writes as follows, dated November 18, 1913:—

"*Appointments.*—Colonel F. H. Treherne, V.H.S., has been appointed Assistant Director of Medical Services, 7th (Meerut) Division, *vice* Colonel E. Butt, retired.

"Colonel G. D. Hunter, D.S.O., has been appointed Assistant Director of Medical Services, Allahabad and Fyzabad Brigades, *vice* Colonel A. E. Tate, transferred as Assistant Director of Medical Services, Bangalore and Southern Brigades.

"Surgeon-General T. M. Corker, has been appointed Deputy Director of Medical Services, 9th (Secunderabad) Division.

"*Extension of Tour of Indian Service.*—The following officer has been allowed to extend his tour of Indian service till the trooping season 1914-15: Captain L. G. Gibson.

"*Leave.*—General leave ex-India to the undermentioned officers has been concurred in: Major J. G. Foster, six months, from December 20, 1913, to June 19, 1914. Major J. McD. McCarthy, six months and one week, from November 28, 1913, to June 3, 1914.

"*Specialists.*—The following officers have been appointed specialists in the subject and Division noted against them: Major J. Matthews, advanced operative surgery, 9th (Secunderabad) Division. (Temporary until the appointment of a permanent specialist). Major J. W. H. Houghton, advanced operative surgery, 7th (Meerut) Division."

**NOTES FROM FREETOWN, SIERRA LEONE, W. AFRICA.**—Captain R. R. Lewis writes: "We arrived at Freetown in the freight ship 'Olenda' at daybreak on July 9, after an uneventful voyage, broken at the Canaries by a stay of six hours at Las Palmas.

"The first thing that strikes one on walking up to report one's arrival at the office of the S.M.O. is that one would sooner employ any other means of transit than the 'flat feet'! The day was an especially hot and muggy one in the rainy season, and I do not remember ever having perspired so much in such a short time! However, one becomes more or less physiologically adapted to this condition after a while, especially on adopting what is known as the 'Sierra Leone walk,' the rate of which is about half a mile per hour.

"The second thing which I believe usually strikes one is an absolute inability to collect one's thoughts coherently, or even to remember small details about things in general which one should ordinarily never forget.

"Apart from these discomforts, my first impression of Tower Hill was, on the whole, a good one. Much can be said for the scenery, which resembles that of Ceylon in many respects. The views from Mount Aureol and Wilberforce Hospitals are quite beautiful, but I was surprised to find that this did not appear to be the general consensus of opinion. It was admitted that they were beautiful on first arrival, but after one had been gazing on the same scene for twelve solid months, one's opinion was apt to alter. After two months in the Colony, I begin to find myself of the same trend of thought.

"It is now nearing the end of the 'rainy' season, and I should imagine that this is quite one of the wettest places on earth. The average rainfall per year is about 170 inches, and during one year over 204 inches of rain fell!

"The result of all this is that in the wet season it is necessary to keep a charcoal fire burning in the morning and evening, or else put one's clothes on in a more or less saturated condition. A pair of dry boots left in a room at night will usually be found to be covered with mildew in the morning.

"On October 2, Major Sparkes and Captains Harty and MacDowall arrived for duty. Captain McIntire returned to England, tour expired on the following day,

and Lieutenant-Colonel Gerrard and Major Statham on six months' leave, after their first year of service on the coast. Major Houghton returned from two months' leave on September 23. Captain Wyatt took over the duties of specialist sanitary officer from Major Statham and I relieved the former officer at Port Lokko on the 23rd. It would seem impossible to serve on this coast without contracting malaria, which is of the malignant tertian type. Captain Wyatt contracted it after being at Lokko ten days, and I did likewise after one fortnight in spite of prophylactic quinine. Out of thirteen Europeans, including British officers and colour-serjeants, eleven suffered from malaria during the month of September at Port Lokko. A larger number of cases of blackwater fever than usual have occurred, even during the short while that I have been here.

"During the month of August, while medical officer at Wilberforce, over 50 per cent of the officers stationed there suffered from malaria. Altogether apart from the malaria, the West African Coast has a climate peculiarly its own. It is extraordinarily enervating, and productive of a condition of intense lassitude towards the end of the day. The first few months are not so noticeable in this respect, but by the time one has completed three-fourths of a tour the condition becomes more or less acute, as evidenced by seeing officers tearing off the pages of their calendars daily and calculating how many days, hours, minutes, and seconds they still have to serve on the Coast! There are those who would suggest that double pay is too much for merely serving on this particular coast, and in reply to them I would say: "Come out and spend a year here, doing six months in the bush! I would guarantee that, at the end of the year, they would be the last people in the world to suggest that every minute of service we spend in this country is not well worth the money we are paid for it. One of the commonest ailments, so to speak, one meets with here, is insomnia. I personally go to bed about 10 p.m. and awake, with extraordinary regularity, at 2 a.m., after which sleep is practically non-obtainable. Quite 30 per cent of officers are similarly affected. However, we cannot 'have it all our own way,' and I have no doubt that after a time I shall get quite accustomed to the 'four-hour night.'"

"West Africa, apart from double service and double pay, no doubt has its redeeming features, although personally I must confess that up to date I have not succeeded in discovering them."

### **SPECIAL RESERVE OF OFFICERS.**

#### **ROYAL ARMY MEDICAL CORPS.**

The undermentioned Lieutenants to be Captains: John R. R. Trist, dated November 30, 1913; Alexander C. Court, M.B., dated December 17, 1913.

The undermentioned Lieutenants are confirmed in their rank: Gerald F. P. Gibbons, Robert Montgomery, M.B.

The undermentioned to be Lieutenants (on probation): Cadet Samuel Griffin, from the Royal College of Surgeons in Ireland Contingent, Officers' Training Corps, dated November 21, 1913; Cadet Serjeant Joseph Harold Baird, from the Edinburgh University Contingent, Officers' Training Corps, dated November 28, 1913.

### **TERRITORIAL FORCE.**

#### **ROYAL ARMY MEDICAL CORPS.**

Surgeon-General Sir Alfred Keogh, K.C.B., M.D., retired pay, is appointed to the Honorary Colonelcy of the Royal Army Medical Corps of the 2nd London Territorial Division, *vice* Lieutenant-Colonel and Honorary Colonel Francis L. Stephenson, C.B., M.B., Retired List (Volunteers), who vacates that appointment, dated December 3, 1913.

*North Midland Mounted Brigade Field Ambulance.*—Lieutenant-Colonel Thomas Thompson resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated December 3, 1913.

*1st East Lancashire Field Ambulance.*—Lieutenant Joseph M. Postlethwaite to be Captain, dated August 2, 1913.

*2nd East Lancashire Field Ambulance.*—The undermentioned Lieutenants to be Captains:—

Charles H. S. Redmond, M.B., dated November 1, 1913.

Andrew W. B. Loudon, M.D., dated November 10, 1913.



*2nd Northumbrian Field Ambulance.*—Alexander Carson Clarke Lawrence to be Lieutenant, dated September 8, 1913.

William Mackenzie Wilson, M.B., to be Lieutenaut, dated September 27, 1913.

*1st Welsh Field Ambulance.*—Transport Officer and Honorary Lieutenant William L. Hopkins resigns his commission, dated December 3, 1913.

*Highland Divisional Clearing Hospital.*—Lieutenant-Colonel Francis Kelly, M.D., from the 1st Highland Field Ambulance, to be Lieutenant-Colonel, dated November 1, 1913.

Captain David Rorie, M.D., from the 1st Highland Field Ambulance, to be Captain, dated November 1, 1913.

*Lowland Divisional Clearing Hospital.*—Major Peter Fleming Shaw, from the 2nd Lowland Field Ambulance, to be Lieutenant-Colonel, dated November 1, 1913.

Lieutenant Geoffrey Balmanno Fleming, M.B., from the 1st Lowland Field Ambulance, to be Lieutenant, dated November 1, 1913.

Acting Serjeant-Major James Law, from the 3rd Scottish General Hospital, to be Quartermaster, with the honorary rank of Lieutenant, dated December 3, 1913.

*1st East Lancashire Field Ambulance.*—Lieutenant Albert Ramsbottom, M.D., to be Captain, dated November 14, 1913.

*3rd East Lancashire Field Ambulance.*—Lieutenant Edward H. Cox, M.B., to be Captain, dated November 14, 1913.

*1st Northumbrian Field Ambulance.*—Captain Frank Hawthorn, M.D., to be Major, dated December 13, 1913.

*2nd West Riding Field Ambulance.*—Robert Garside Dixon, M.B., to be Lieutenant, dated November 1, 1913.

*3rd Welsh Field Ambulance.*—Lieutenant William A. T. Lloyd resigns his commission, dated December 13, 1913.

#### *Officers attached to other units.*

Lieutenant Charles P. Woodstock to be Captain, dated July 1, 1913.

Lieutenant William Gilchrist, M.B., resigns his commission, dated December 3, 1913.

William Rex Collingridge to be Lieutenant, dated December 3, 1913.

Captain Lionel H. Moiser, M.B., resigns his commission, dated December 10, 1913.

Captain John G. Martin, M.B., to be Major, dated October 26, 1913.

Lieutenant Noel W. Kidston, M.B., to be Captain, dated November 1, 1913.

Lieutenant James W. McIntosh, M.B., resigns his commission, dated December 13, 1913.

William George, M.B., to be Lieutenant, dated December 13, 1913.

#### **QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.**

*Postings and Transfers.*—Matrons: Miss A. B. Smith, R.R.C., to Aldershot, from Colchester. Sisters: Miss M. M. Blakely, to Colchester, from Tidworth, as acting matron; Miss M. E. M. Grierson, to Khartoum, from Cairo; Miss M. German, to Cairo, from Khartoum; Miss S. O. Beamish, to Tidworth, from Dublin. Staff Nurses: Miss F. M. M. Malim, to Tidworth, from Devonport; Miss M. Hale, to Aldershot, from Woolwich; Miss A. Shearer, to Aldershot, on provisional appointment; Miss V. A. Johannessen, to London, on provisional appointment.

*Appointments Confirmed. Staff Nurses.*—Miss L. A. Parker, Miss E. L. Hall, Miss M. R. Casswell.

## **ROYAL ARMY MEDICAL CORPS MESS, LONDON.**

It may interest Officers of the Corps to learn that a valuable collection of works of art was bequeathed to the Mess under the will of the late Lieutenant-Colonel R. Manifold Craig, R.A.M.C. (retired). The collection was valued for probate at £225, on which a legacy duty of £22 10s. was paid. The following extract from Lieutenant-Colonel Craig's will deals with this bequest:—

“I give and bequeath unto the President and Committee of the Officers' Mess, Royal Army Medical Staff, Grosvenor Road, in addition to any previous gifts given during my

lifetime to those gentlemen, the four Chippendale chairs and the two carved English carving chairs, and the following pictures if not already presented or handed over to the Mess: 'Poets' Corner,' by Ivers; 'The Goddesses and Actæon,' by Rottenhamer; 'Woodland View,' in the manner of Hobbema; 'A Jewish Banker,' by Cattermole; 'Still Life' (Shells, Statuette, &c.), by Etty; 'Water Goddess and Fish,' by Rottenhamer; 'The Pig Yard,' reputed Morland; 'The Young Farmer' (Morland); 'The White Horse' (Morland); 'Snake, Thistle, and Butterflies' (Otho Marcellis or van Schrick); 'Landscape with Figures' (Salvator Rosa) and Dughet large still life picture (musical instruments, &c.), by Cornelis Brise; 'The Bandits' Hiding Place' (Salvator Rosa); 'A Storm Ahead' (Pynacker); the two volumes of the Dictionary of Painters and Engravers by Bryan; the three volumes of photographs of China, by Thompson; and the Carter Bath Chair, the latter for the use of sick Officers." Among the gifts made during his lifetime were the following: Two panels of early 16th Century Flemish Tapestry, an illuminated vellum Armenian manuscript, "Sharagan," and some ancient pottery. The Carter Bath Chair was handed over to the Queen Alexandra Military Hospital for the use of sick Officers.

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## ROYAL ARMY MEDICAL CORPS CENTRAL MESS AND GAMES COMMITTEE.

*The late R.A.M.C. Mess, Tempe, O.F.S.*—It will be remembered that the members of the late Tempe Mess generously handed over the assets and presentations belonging to it to the Central Mess Fund for custody and disposal, preference to be given to a R.A.M.C. mess starting in South Africa, failing that to a R.A.M.C. mess elsewhere. In addition to the articles of plate, &c., already received, the credit balance of the Tempe Mess, amounting to the handsome sum of £76 12s. 6d., has now been paid into the Central Mess Fund.

*Retired Officers.*—The Committee having been informed that some officers on the retired list are desirous of subscribing to the Fund, the following resolution was adopted at the Annual Meeting last June: "That officers on the retired and half-pay lists be eligible to subscribe to the Fund, and that their annual subscription be at the rate of one half of one day's retired or half pay of their rank. That established messes be invited to accord the privileges of honorary membership to such subscribers."

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## NOTES ON GAMES AND SPORT.

*Association Football.*—Serjeant-Major C. Drury, R.A.M.C., Hon. Secretary of the R.A.M.C. Football Club, sends the following report of the doings of the Aldershot team, whose success will be much appreciated by the whole Corps:—

"No doubt it will interest the Corps in general to know how the football team figures in this sport at Aldershot. In the first place we have the following N.C.O.s and men to pick from: Corporals Prince and Miller; Privates Quelch, Bates, Forshaw, Southall, Gillham, Morris, Veitch, White and Darby, all old players; also Lance-Corporal Brindle, Private Wykes and Bugler Osborne, who played for the first team on one or two occasions last year, so really no new player has been discovered.

"The following competitions have been entered into for the season 1913-14:—

"The Amateur Cup, the Army Cup, the Hants Senior Cup, the Aldershot Senior Cup, the Aldershot Senior Military League.

"The matches played, with results, are as follows:—

## "ROYAL ARMY MEDICAL CORPS FOOTBALL CLUB, 1913-14.

## "FIXTURES AND RESULTS, 1913-14.

Date	Whom played	Result	GOALS		Where	Competition
			For	Against		
6.9.13	Farnham United ..	Won	13	0	Farnham	Friendly.
13.9.13	Reading Reserves ..	"	3	1	Reading	"
27.9.13	A.S. Corps ..	"	11	3	Home ..	"
1.10.13	R. Berks. Regt. ..	"	11	0	" ..	Aldershot S.L.
8.10.13	Reading Amateurs..	"	6	1	Reading	Friendly.
18.10.13	1st Scots Guards ..	"	3	1	Home ..	1st Round Army Cup.
25.10.13	" ..	"	3	1	" ..	Hants Senior Cup.
30.10.13	R. Engineers ..	Lost	2	3	Away ..	Aldershot S.L.
1.11.13	Cam and Yorktown	Won	7	0	" ..	English Amateur Cup.
5.11.13	R.M. Fusiliers ..	"	2	1	Home ..	Aldershot S.L.
8.11.13	1st L.N. Lancs. ..	Draw	1	1	Away ..	2nd Rd. Hants S. Cup.
12.11.13	2nd Worcesters ..	Won	1	0	Home ..	Aldershot S.L.
15.11.13	1st L.N. Lancs. ..	Lost	0	1	" ..	Replay 2nd Round Hants Senior Cup.
19.11.13	1st K.R.R.C. ..	Won	2	1	" ..	2nd Round Army Cup.
22.11.13	1st L.N. Lancs. ..	"	7	0	" ..	4th Qual. Round Ama- teur Cup.
24.11.13	2nd Bt. H.L.I. ..	"	2	0	" ..	Aldershot S.L.
26.11.13	1st Bt. Scots Gds. ..	Draw	2	2	" ..	Aldershot Senior Cup.
29.11.13	R. Engineers ..	Lost	1	4	Eggar's Hill	Charity Cup.
3.12.13	1st Bt. Scots Gds. ..	Draw	1	1	Away ..	Alders. Senior League.
10.12.13	" ..	Won	2	1	" ..	Sen. Cup Replay.
16.12.13	1st R. Berks. ..	"	5	0	Home ..	3rd Round Army Cup.
			85	22		

"Of course it could not be expected that we could go through the season without injuries, but we have been fairly fortunate, taking into consideration the strenuous game that is played here, and the crack teams we have met, only three admissions to hospital for severe sprains being our chief casualties; still our Masseur Corporal Baigent has been kept very busy.

## "Boys' Team.

Date	Whom played	Result	GOALS		Where	Competition
			For	Against		
29.9.13	L.N. Lancs. Regt. ..	Won	5	0	Home ..	Boys' League.
6.10.13	R. Engineers ..	"	7	0	" ..	" ..
16.10.13	1st R. Highlanders	"	5	0	Away ..	" ..
23.10.13	1st Scots Guards ..	"	8	0	Home ..	" ..
30.10.13	1st Colds. Guards ..	"	7	0	Away ..	" ..
6.11.13	1st Northamptons..	"	14	0	Home ..	" ..
10.11.13	1st R. Highlanders	"	7	0	" ..	" ..
13.11.13	R.M. Fusiliers ..	"	9	0	Away ..	" ..
17.11.13	1st Scots Guards ..	"	2	0	" ..	" ..
24.11.13	R. Engineers ..	"	2	0	" ..	" ..
27.11.13	R.M. Fusiliers ..	"	5	0	Home ..	" ..
			71	0		

"The Boys' team in the Aldershot Command League have carried all before them; this is doubly interesting owing to the fact that ten of the team are sons of serving and time-expired members of the Corps, as their names prove: Osborne, Conway, Coad, Steer, Tuson, Lever, Elmer, Henfrey, Halliday and Tomlin.

"The goalkeeper, Mills, has the distinction of being the smallest in the Aldershot Command in that capacity."

No. 18 and No. 35 Companies were defeated in the 3rd round of the Regent's Park Cup.

*Rugby Football.*—The following officers were selected to play for the Army v. R.M.A., Woolwich, and R.M.C., Sandhurst: Lieutenant J. L. Huggan (three-quarter), Lieutenant H. C. D. Rankin (half), Lieutenant R. C. Carlyle (forward), Lieutenant G. F. Allison (reserve). Against the London Scottish, Lieutenants J. L. Huggan (three-quarter), G. F. Allison (three-quarter), and R. C. Carlyle played for the Army, and H. C. D. Rankin (half) for the Scottish.

*Rowing.*—At the half-yearly General Meeting of the members of the London Mess, the advisability of forming a Corps rowing club, brought forward by Captain M. P. Leahy, was discussed. The matter is under consideration.

*Hockey.*—The Aldershot team was beaten (2—1) in the second round of the Army Tournament by a very strong Army Service Corps XI. All played well, Lieutenant Ritchie's game being brilliant. R.A.M.C.—Goal, Private Blair; backs, Staff-Serjeant Robinson, Private Derby; halves, Serjeant Prince, Lieutenant Ritchie, Quarter-master-Serjeant Enright; forwards, Captain Wright, Lance-Corporal Jepp, Lieutenant Ball, Corporal Mack, Private Page.

*Golf.*—The Captains' Class, 1912-13, has presented a handsome cup to the London Mess for annual competition, by match play; the cup to remain in the mess and a duplicate to be presented to the winner. The competition to take place between November and July. A committee has been appointed to draw up rules for the competition.

The Annual Army Championship Meeting usually takes place at Easter. Golfers are reminded that, under a scheme approved by the Army Golf Committee, the Corps is divided into twelve units for the purpose of entry for this competition. Details will be found in Corps News for May, 1913, p. 119. Hitherto only the Aldershot Command has been eligible. It is hoped that the new conditions will be inaugurated by a good entry.

The Hon. Secretary would be glad of any information on the above topics, which is not sent up under the heading of Local Notes from the various stations. For publication in the JOURNAL, it should reach him not later than the 19th of each month.

3, Homefield Road,  
Wimbledon, S.W.

J. T. CLAPHAM, Captain,  
Hon. Secretary.

## ANNUAL COMPETITION FOR THE MILITARY HOSPITAL COOKERY CHALLENGE SHIELD.

THE Fifth Annual Competition for the Military Hospital Cookery Challenge Shield took place at the Twenty-fourth Universal Cookery and Food Exhibition, held at the Royal Horticultural Hall, Westminster, from October 28 to November 1.

The results were as follows:—

(1) Nos. 1 and 3 Companies R.A.M.C., Cambridge Hospital, Aldershot, winners of the Challenge Shield, 356 marks. 10425 Serjeant A. Tollafield, Special Silver Medal. 18808 Corporal W. Steels, Silver Medal and 5s. 4898 Private W. H. Wicken, Bronze Medal and 5s.

(2) No. 20 Company R.A.M.C., Tidworth, 348 marks. 7196 Serjeant W. F. Longman, Special Silver Medal. 6269 Private A. H. Dixon, Silver Medal and 5s. 19845 Private A. J. Reynolds, Bronze Medal and 5s.

(3) No. 14 Company, King George V. Hospital, Dublin, 326 marks. 6366 Private H. Edwards, Silver Medal and 5s. 5862 Private G. T. Gwilt, Silver Medal and 5s.

(4) *No. 7 Company R.A.M.C., Devonport*, 320 marks. 12195 Serjeant A. Joyce, Silver Medal and 5s. 19515 Lance-Corporal G. D. Salter, Bronze Medal and 2s. 6d.

(5) *No. 11 Company R.A.M.C., Dover*, 302 marks. 5112 Private E. S. H. Gregory, silver medal and 5s.

(6) *No. 2 Company R.A.M.C., Connaught Hospital, Aldershot*, 259 marks. 15764 Lance-Corporal G. Ellison, Bronze Medal and 2s. 6d. 5598 Private G. H. Edwards, Certificate of Merit and 2s. 6d.

(7) *No. 35 Company, Queen Alexandra Military Hospital, Millbank*, 259 marks. 5396 Private J. H. Thompson, Bronze Medal and 2s. 6d. 10191 Lance-Serjeant G. R. Moore, Certificate of Merit and 2s. 6d.

(8) *No. 6 Company R.A.M.C., Alexandra Hospital, Cosham*, 255 marks. 18675 Corporal A. C. Partridge, Bronze Medal and 2s. 6d.

(9) *No. 11 Company, Shorncliffe*, 255 marks. 19409 Private A. Hutchinson, Certificate of Merit and 2s. 6d. 6478 Private H. Leake, Certificate of Merit and 2s. 6d.

(10) *No. 10 Company R.A.M.C., Chatham*, 244 marks. 19941 Private E. P. Gowing, Certificate of Merit and 2s. 6d.

(11) *No. 12 Company R.A.M.C., Woolwich*, 220 marks. 19581 Lance-Corporal H. J. Cannon, Certificate of Merit and 2s. 6d.

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## UNITED SERVICE MEDICAL SOCIETY.

THE next meeting of the above Society will be held at the Royal Naval Medical College, Greenwich, on Thursday, January 8, 1914, at 5 p.m. Subject: "Antarctic Experiences," by Surgeon E. L. Atkinson, R.N.

A train leaves Charing Cross at 4.10 p.m., arriving at Greenwich at 4.34 p.m. Train leaves Greenwich at 5.30 p.m. and 6.24 p.m., arriving at Charing Cross at 6.13 p.m. and 6.43 p.m. respectively.

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## THE ARMY AND NAVY MALE NURSES' CO-OPERATION.

### SIXTH ANNUAL REPORT, 1912-13.

THE Sixth Annual General Meeting of the Army and Navy Male Nurses' Co-operation was held at 11a, Welbeck Street, W., on Wednesday, October 8, 1913, at 2.30 p.m., Sir Dyce Duckworth, Bt., M.D., in the chair. After the minutes of the last general meeting had been read and confirmed, the following report of the Executive Committee was received.

*Report.*—The Executive Committee, in presenting their Sixth Annual General Report, are pleased to state that the Co-operation has made progress during the past year, and that its services are becoming more generally appreciated.

Since June 30, 1912, forty-two nurses have been regularly employed, and 319 patients have been nursed.

The receipts for the nursing services have amounted to £3,926 7s. 9d., showing an increase of £206 11s.

Seven thousand copies of the reports and circulars have been sent to medical practitioners in the London district and Provinces.

*Finances.*—The balance sheet of the year, prepared by the honorary auditors, is appended, and the Committee desire to draw attention to the following contributions from various bodies:—

Naval and Military Tournament (Army Council) ...	£20	0	0
Surgeon-General Christopher Pearson ...	1	1	0
A. S. Williams, Esq. ...	1	1	0
Profits from Canteens on board H.M. Transports ...	5	0	0
Naval and Military Tournament (Admiralty) ...	25	0	0
Earl of Lonsdale ...	5	0	0
Major H. G. Fell, R.A.M.C. ...	1	1	0
Royal Army Medical Corps Fund ...	5	0	0

The Committee are pleased to report that their Royal Highnesses Princess Christian of Schleswig-Holstein, Princess Louise (Duchess of Argyll), and Princess Beatrice (Princess Henry of Battenberg) have also graciously consented to become Patronesses of the Co-operation.

Three resignations from the Executive Committee have occurred in the persons of Major Ferguson, D.S.O., R.A.M.C., who has gone abroad, Sir Rowland Bailey, C.B., M.V.O., and Miss Becher, R.R.C., Matron-in-Chief, Q.A.I.M.N.S.

The following new members have been appointed and have accepted office: John Adams, Esq., F.R.C.S., Mrs. Donald Armour, Captain Alfred Seton-Christopher (late Seaforth Highlanders), Surgeon-General A. W. May, C.B., Director-General R.N.

This Committee has met ten times; the Selection and Discipline Committee three times, and the House Committee once.

It is to be noted that the Co-operation is almost self-supporting, but it is clear to the Executive Committee that a continuance of outside support is necessary to establish this excellent work on a firmer basis. Skilled men nurses are more and more recognized as necessary for many patients, and there is no better source for obtaining such services than a Co-operation such as this, which selects and assumes responsibility for trained men of high character and practical experience, who have the additional claim on the public of having done good service to their country, and are ready to resume it whenever called upon in case of war.

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## ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

THE Committee of the Army Medical Officers' Widows' and Orphans' Fund wishes to bring to the notice of officers of the Corps the benefits offered by this Society; and to draw attention to its strong financial position, as disclosed by the Actuary's Report on the recent quinquennial valuation of the Fund. In this report (a copy of which may be obtained from the Secretary) the Actuary states that "the financial position of the Society continues to be eminently satisfactory," and adds that from the Fund officers can obtain "at least a minimum provision for their widows and orphans at a much lower cost than from any Life Assurance Company or other Society."

The annual subscription of a married member provides an annuity of £50, during widowhood, to the widow of the marriage, during which his subscription as a married member began. In the event of the death of the widow this annuity is continued to the children of such marriage until the youngest attains the age of 21 years. It also continues for their benefit, up to the same age, if the widow re-marries. Furthermore, should the wife of the subscriber predecease him, it will be optional for him to continue the subscription he had been paying as a married member, in order to provide an annuity similar to the above for the children of the marriage, until the youngest shall have attained the age of 21 years.

Provision is also made (Rule X) whereby a part of the surplus at any quinquennial valuation may be applied for the benefit of members, or their wives, or orphan children. Thus, at the valuation as at December 31, 1910, a portion of the surplus was appropriated to bring the £50 annuities, immediate and contingent, in respect of members, married and unmarried, on the books at December 31, 1910, up to the present statutory limit of £52 per annum; and also to provide a sum of £100 (in addition to the first half-yearly annuity payment) immediately on the death of every first-class married member on the books at December 31, 1910, should he predecease his present wife.



There is every reason to presume that at the next quinquennial valuation similar additional benefits may be granted to members now joining.

Unmarried officers may become members by paying £2 yearly, and can thus reduce the rate of their subscriptions when married. They are eligible to share in such distribution of surplus as may from time to time take place under Rule X, and at the last distribution did so benefit. They also safeguard themselves against the possible closure of the Fund in war time, mentioned below.

A table of the rates of subscription will be found at the end of the Book of Rules, at which rates some examples are given below :—

Husband's age				Wife's age			Annual subscriptions.		
							£	s.	d.
25	..	..	..	20	..	..	13	8	5
28	..	..	..	32	..	..	11	18	2
30	..	..	..	27	..	..	14	6	1
32	..	..	..	28	..	..	15	5	9
33	..	..	..	33	..	..	14	5	10
35	..	..	..	25	..	..	18	9	1
36	..	..	..	33	..	..	16	17	2
38	..	..	..	28	..	..	19	19	6
42	..	..	..	38	..	..	19	6	8
46	..	..	..	40	..	..	21	12	6
50	..	..	..	45	..	..	24	9	5
50	..	..	..	50	..	..	20	11	1
55	..	..	..	50	..	..	27	19	6

*These terms cover all war and climate risks, and there are no marriage fines. But on the imminence or outbreak of war the Committee are empowered to close the Fund temporarily to applicants for membership, or to admit them at a special war rate.*

Copies of the Rules, Actuary's Report, Annual Report, and Balance Sheet, together with Declaration Forms, can be obtained from the Secretary, who will be glad to give any other information in his power.

20, Belgrave Road,  
London, S. W.

J. T. CLAPHAM, Captain,  
Secretary.

## SEAMEN'S HOSPITAL SOCIETY.

LONDON SCHOOL OF TROPICAL MEDICINE (UNIVERSITY OF LONDON), CONNAUGHT ROAD,  
ALBERT DOCK, LONDON, E.

### *New Course in Tropical Sanitation and Hygiene.*

Arrangements have been made for a new Course to be held during the October and May Sessions. This will be open to students who have already attended the ordinary curriculum, and in exceptional cases Medical Officers of Health, Sanitary Officers and others interested in preventive medicine, who are not students of the school, will, with the permission of the School Committee, be admitted.

The Course will consist of Lectures and Demonstrations and will extend over two months. For those who desire it one month's laboratory work, under direction, will be added to enable students who have taken the ordinary course to be signed up for six months, the period required for the Diploma in Diseases and Hygiene of the Tropics of the Conjoint Board in London. Three months' study is required for the Cambridge Diploma in Tropical Medicine and Hygiene, and one year for the London M.D. (Part VI. Tropical Medicine).

The Course will comprise Bacteriology, Entomology, Helminthology, Protozoology, Hygiene, Chemical Analyses of Water and Food, Elementary Surveying, Port Health Examination, &c.

*Fees for the Course.*—To students of the school, £1 1s. per week; to non-students, £16 16s. for the full course of eight or twelve weeks.

Further particulars may be had from the Secretary, Seamen's Hospital Society, Greenwich, London, S.E.

October, 1913.

## OBITUARY.

### BRIGADE-SURGEON CONSTANTINE CARIDI READ.

HONORARY BRIGADE-SURGEON C. C. READ died at Richmond on December 8, aged 82. He was appointed Assistant Surgeon, Staff, May 13, 1853; 91st Foot, August 5, 1853; Grenadier Guards, May 5, 1854; Surgeon, Staff, December 12, 1868; Grenadier Guards, same date. He was promoted Surgeon-Major, Army Medical Department, March 1, 1873, and appointed Battalion Surgeon, Coldstream Guards, April 3, 1874; Surgeon-Major, Coldstream Guards, December 8, 1885. He retired with the honorary rank of Brigade-Surgeon, December 9, 1885. His war service was: Crimean Campaign, 1854. Siege and fall of Sevastopol. Medal with clasp; Turkish medal Soudan Expedition, 1885. Suakin; medal with clasp, bronze star. He was prominently brought to notice for service with the Suakin Expedition.

### BRIGADE-SURGEON EDWARD FOOTNER.

BRIGADE-SURGEON E. FOOTNER, late of the Army Medical Service, died recently at Westcliff-on-Sea. He was educated at St. Thomas's Hospital, and took the diplomas of M.R.C.S. England and L.S.A. in 1858, and the degrees of M.D., C.M. Aberdeen in 1884. He entered the Army as an Assistant Surgeon, Staff, on April 1, 1861; was placed on half-pay September 1, 1861; appointed to the Staff July 8, 1862; to 72nd Foot, August 28, 1863; Staff, November 9, 1867; 91st Foot, June 21, 1871. He was promoted Surgeon, Army Medical Department, March 1, 1873; and Surgeon-Major, April 1, 1876. He retired with the honorary rank of Brigade-Surgeon, October 27, 1882.

His war service was: Afghan War, 1878-80, Battles of Ahmed Khel and Urzoo. During the campaign he performed specially good service and received the medal and clasp.

## BIRTHS.

THOMPSON.—At Pachmarhi, C. P. India, on November 2, the wife of Major A. G. Thompson, R.A.M.C., of a son.

JONES.—On November 13, at Westhill, Calicut, India, the wife of Major J. L. Jones, of a son.

## DEATHS.

NICHOLLS.—At Polemedia, Cyprus, on Sunday, November 16, Margaret Aimée, wife of Captain J. B. Nicholls, R.A.M.C., after giving birth to a still-born child.

READ.—At Richmond, Surrey, on December 8, 1913, Honorary Brigade-Surgeon Constantine Caridi Read, late Surgeon-Major Coldstream Guards.

FOOTNER.—Honorary Brigade-Surgeon Edward Footner, at Westcliff-on-Sea.

**EXCHANGES, &c.**

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

Major, due for foreign service next Trooping Season, wishes to exchange with an Officer low down on roster. Apply, "Motor," c/o Messrs. Holt and Co., London.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates :—

NUMBER OF REPRINTS	NUMBER OF PAGES	COST OF REPRINTS	COST OF EXCERPTS *	EXTRA FOR COVERS FOR REPRINTS			
				As Journal, Printed on Front	As Journal, Plain, Unprinted	Cheaper Paper, Printed on Front	Cheaper Paper, Plain, Unprinted
		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

\* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that may happen to appear on the first and last pages of the particular excerpt ordered.

**CASES FOR BINDING VOLUMES.**—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.

These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

*All Applications for Advertisements to be made to—*

G. STREET & CO., LTD., 8, SERLE STREET, LONDON, W.C.

The back outside cover is not available for advertisements.

## Notices.

### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

**All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.**

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S. W.

Communications have been received from Lieut.-Colonel H. P. Elkington, Major J. V. Forrest, Staff-Serjeant E. B. Dewberry, Lieutenant-Colonel C. Birt, Captain W. E. C. Lunn, Major F. E. Gunter.

The following publications have been received :—

*British :* Transactions of the Society of Tropical Medicine and Hygiene, The Hospital, Guy's Hospital Gazette, The Journal of Tropical Medicine and Hygiene, Journal of the United Service Institution, The Army Service Corps Journal, The Indian Medical Gazette, The Lancet, The St. Thomas's Hospital Gazette, Medical Press and Circular, The Army and Navy Gazette, The Australasian Medical Gazette, The Practitioner, Tropical Diseases Bulletin, The Medical Journal of South Africa, The Royal Engineers' Journal, St. Bartholomew's Hospital Journal, Yellow Fever Bureau Bulletin, Medical Review, The Journal of State Medicine, Public Health, The Middlessex Hospital Journal.

*Foreign :* Bulletin of the Johns Hopkins Hospital, Le Caducée, Deutsche Militär-ärztliche Zeitschrift, United States Public Health Service, Archiv für Schiffs- und Tropen-Hygiene, Annali de Medicina Navale e Coloniale, Giornale di Medicina Militare, Archivos de Higiene e Patologia Exoticas, Bulletin de la Société de Pathologie Exotique, Schmidt's Jahrbücher, Revista de Sanidad Militar, Boletín de Sanidad Militar, Archives de Médecine et Pharmacie Navales, Zeitschrift für Militärärzte, Bulletin de l'Institut Pasteur, The Journal of Infectious Diseases, Office International d'Hygiène Publique, Russian Naval Medical Journal, Centralblatt für Bakteriologie.

## MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

**Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.**

**Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.**

**It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.**

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,  
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"  
WAR OFFICE, WHITEHALL, S.W.



# JOURNAL

OF THE

## ROYAL ARMY MEDICAL CORPS.

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### Corps News.

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FEBRUARY, 1914.

#### HONOURS.

The King has been graciously pleased to confer the honour of Knighthood upon Surgeon-General Arthur Thomas Sloggett, C.B., C.M.G., K.H.S., Director Medical Services in India.

The King has been graciously pleased to give orders for the following appointment to the Most Honourable Order of the Bath: To be Ordinary Member of the Military Division, or Companion of the said Most Honourable Order: Surgeon-General Harold George Hathaway, Deputy Director of Medical Services, India.

#### ESTABLISHMENTS.

Royal Hospital, Chelsea: Lieutenant-Colonel George A. T. Bray, Royal Army Medical Corps, to be Deputy Surgeon, *vice* Lieutenant-Colonel H. E. Winter, who has vacated the appointment, dated January 20, 1914.

#### ARMY MEDICAL SERVICE.

Surgeon-General Owen E. P. Lloyd, V.C., C.B., is placed on retired pay, dated January 1, 1914.

Colonel Walter G. A. Bedford, C.M.G., to be Surgeon-General, *vice* O. E. P. Lloyd, V.C., C.B., dated January 1, 1914.

Colonel Alexander F. Russell, C.M.G., M.B., is placed on retired pay, dated December 21, 1913.

Colonel Thomas J. R. Lucas, C.B., M.B., on completion of four years' service in his rank, retires on retired pay, dated January 2, 1914.

Colonel Robert Porter, M.B., on completion of four years' service in his rank, is placed on the half-pay list, dated January 14, 1914.

The undermentioned officers from the Royal Army Medical Corps to be Colonels:—  
Lieutenant-Colonel Neville Manders, *vice* A. F. Russell, C.M.G., M.B., dated December 21, 1913.

Lieutenant-Colonel Cecil Birt, *vice* W. G. A. Bedford, C.M.G., dated January 1, 1914.

Brevet-Colonel Robert S. F. Henderson, M.B., K.H.P., *vice* T. J. R. Lucas, C.B., retired, dated January 2, 1914.

Lieutenant-Colonel Michael W. Russell, *vice* R. Porter, M.B., to half pay, dated January 14, 1914.

#### ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Arthur R. Aldridge, C.S.I., M.B., retires on retired pay, dated January 3, 1914.

The undermentioned officers to be Lieutenant-Colonels:—

Major James C. Jameson, M.B., *vice* N. Manders, dated December 21, 1913.

Brevet-Lieutenant-Colonel Edgar M. Pilcher, D.S.O., *vice* C. Birt, dated January 1, 1914.

Major William G. Beyts, *vice* E. M. Pilcher, D.S.O., supernumerary, dated January 1, 1914.

The undermentioned Supernumerary Lieutenant-Colonels are restored to the establishment:—

T. du B. Whaite, M.B., *vice* R. S. F. Henderson, dated January 2, 1914.

Herbert E. Winter, *vice* G. A. T. Bray, Supernumerary, dated January 20, 1914.

Major George St. Clair Thom, M.B., to be Deputy Assistant Director of Medical Services of a Territorial Division, dated December 13, 1913.

Major John V. Forrest, M.B., to be a Deputy Assistant Director-General (attached to the Department of the Director of Military Operations at the War Office), *vice* Major C. E. Pollock, dated December 29, 1913.

Major William D. Erskine, M.B., retires on retired pay, dated January 3, 1914.

The undermentioned Captains to be Majors:—

Leonard Cotterill, M.B., dated December 5, 1914.

William J. S. Harvey, dated January 14, 1914.

The undermentioned supernumerary officers are restored to the establishment:—

Captain Richard J. C. Thompson, dated December 12, 1913.

Captain William E. Marshall, M.B., dated January 1, 1914.

Lieutenant Bernard Woodhouse, dated January 1, 1914.

Lieutenant Percival D. Warburton, dated January 24, 1914.

**HIGHER RATE OF PAY.**—Lieutenant-Colonels C. J. MacDonald, R. W. Wright, and E. Eckersley have been selected for the increased pay under Article 358, Royal Warrant for Pay and Promotion.

**ARRIVALS HOME FOR DUTY.**—From India: on December 30, Lieutenant-Colonel N. Faichnie, Major H. K. Palmer, Captains C. W. Bowle and A. C. Elliott; on January 8, Lieutenant-Colonel C. W. H. Whitestone, Major E. F. Q. L'Estrange, Captains D. de C. O'Grady, W. Mitchell and W. E. C. Lunn. From Hong Kong: as on December 17, Major F. S. Penny. From Mauritius: on January 13, Major V. J. Crawford and Captain A. N. R. McNeill. From Straits Settlements: on January 13, Captains R. Rutherford and E. V. Vaughan.

**ARRIVALS HOME ON LEAVE.**—Lieutenant-Colonel G. G. Adams, Majors J. McD. McCarthy, H. S. Roch, J. H. R. Bond, J. G. Foster and T. B. Unwin, Captains T. B. Nicholls and S. McK. Saunders.

**POSTINGS.**—Northern Command: Captain A. N. R. McNeill. Western Command: Lieutenant-Colonel N. Faichnie, Major J. D. G. Macpherson, Captains R. Rutherford and W. Mitchell. Aldershot: Captains A. H. Heslop and W. E. C. Lunn, Lieutenant H. C. D. Rankin. Eastern Command: Captains D. de C. O'Grady and A. C. Elliott, Lieutenant F. C. Cowtan. London District: Lieutenants W. V. Corbett and N. T. Whitehead. Queen Alexandra Military Hospital, London: Lieutenant R. B. Price. Irish Command: Majors F. S. Penny and E. F. Q. L'Estrange, Captains C. R. Millar, E. D. Caddell, J. R. Foster and C. W. Bowle. Southern Command: Lieutenant-Colonel C. W. H. Whitestone, Majors F. E. Gunter, H. K. Palmer and V. J. Crawford, Captain E. V. Vaughan.

**TRANSFERS.**—To Woolwich: Lieutenant-Colonel A. L. F. Bate, from Preston. To Aldershot: Lieutenant-Colonel H. C. Thurston, C.M.G., from the Royal Military College. To the Royal Military College: Major C. B. Martin, from Cahir. To the Royal Army Medical College: Captain A. C. H. Gray, from Dublin.

**TRANSFERS TO THE HOME ESTABLISHMENT.**—From India, on February 3, Captain J. R. Foster; on February 8, Captain A.H. Heslop.

**APPOINTMENTS.**—Colonel M. W. Russell, Deputy Director of Medical Services Malta. Brevet-Colonel Sir W. B. Leishman, Knt., K.H.P., Member of the Army Medical Advisory Board (as Expert in Tropical Medicine). Lieutenant-Colonel A. L. F. Bate, Medical Examiner of Recruits, Woolwich. Lieutenant-Colonel C. W. H. Whitestone, charge of the Military Hospital, Hilsea. Territorial Force. Captain R. H. MacNicol, Specialist in Dermatology, Malta. Captain T. H. Gibbon, Clinical Pathologist, Dublin.

**RETIRED PAY APPOINTMENT.**—Major C. J. Holmes, Medical Charge at Lancaster.

**EMBARKATIONS.**—For India: on December 7, Lieutenant-Colonel B. J. Inniss (at Mauritius); on January 10, Lieutenant-Colonel T. du B. Whaite, Majors R. L. Popham and R. McK. Skinner, Captains F. C. Lambert and T. C. C. Leslie, Lieutenants C. M. Ingoldby, S. J. Higgins, G. A. Blake, L. Dunbar and H. E. Panton; on January 21, Lieutenant-Colonel H. E. Winter, Major E. E. Parkes, Captains A. H. Hayes and M. Keane, Lieutenants R. Davidson, A. G. Biggam, R. K. Mallam, W. McNaughtan, D. T. M. Large, M. Burnett, A. Hood, C. J. Blaikie, J. R. M. Frobisher, W. Stevenson, J. L. Ritchie, D. T. Richardson, R. W. Vint and A. A. M. Davies. For Gibraltar: on December 23, Captain J. B. Meldon (by exchange). For Bermuda: on January 1, Lieutenant-Colonel G. W. Tate. For West Africa: on January 7, Captain J. H. Douglass. For Malta: on January 24, Colonel M. W. Russell, Captains J. G. Carmichael and R. H. MacNicol. For Egypt: on January 24, Lieutenant W. L. Webster.

**RESULT OF EXAMINATIONS.**—The following results of examinations are notified for general information:—

Passed for promotion to the rank of Lieutenant-Colonel:—

In Appendix xiv, K.R., Part ii: Majors M. Boyle, R. J. Blackham, C.I.E., H. Hewetson, G. H. Goddard and J. W. Leake.

Passed for promotion to the rank of Major:—

In Appendix xi, K.R., Subhead (b); Captains C. W. Holden, H. T. Stack, C. R. Sylvester-Bradley, T. C. Lucas and C. Scaife.

In Appendix xi, K.R., Subhead (c) ii: Brevet-Major A. B. Smallman, Captains W. F. Ellis, G. H. J. Brown, A. L. Otway, N. Low, R. K. White, D. de C. O'Grady, P. S. Stewart, W. K. Beaman, O. R. McEwen, G. Petit and G. S. Parkinson.

In Appendix ix, K.R., Subhead (d) ii: Captain L. Cotterill.

Passed for promotion to the rank of Captain:—

In Appendix xi, K.R., Subhead (c) ii: Lieutenants T. J. Hallinan, G. O. Chambers, B. Biggar, W. L. Webster, R. K. Mallam, W. McNaughtan, C. J. Blaikie, C. M. Ingoldby, S. J. Higgins, E. C. Lang and J. C. Sproule.

#### WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.

##### DISCHARGES.

9890	Qmr.-Serjt.	Perry, C. . . .	27.12.13	Termination of second period.
6692	"	Miller, H. G. . .	30.12.13	After 3 months' notice.
9915	Staff-Serjt.	Thuillier, E. . .	20.1.14	Termination of second period.
13666	Serjeant . .	Hughes, W. C. . .	31.12.12	Free after 12 years.
9977	" . .	Walden, W. C. . .	15.1.14	Termination of second period.
9911	" . .	Boulton, J. H. R. .	17.1.14	" " "
16303	Corporal . .	Cunningham, H. . .	11.12.13	Free after 12 years.
9784	" . .	Hughes, C. . . .	28.12.13	Medically unfit.
2027	Private . .	Coney, E. H. . .	19.12.13	" " "
16851	" . .	Clendinning, W. J. .	16.12.13	Termination of first period.
5096	" . .	Beattie, H. . . .	24.11.13	Payment of £18.
18037	" . .	Lightfoot, J. . . .	11.12.13	After 3 months' notice.
11959	" . .	Jones, A. E. . . .	24.12.13	Free after 12 years.
16947	" . .	Cowdery, W. C. . .	29.12.13	Termination of first period.
17003	" . .	Keeley, C. R. . . .	5.1.14	" " "
198	" . .	Godsell, A. V. . .	13.1.14	Medically unfit.
993	" . .	Johnson, T. . . .	29.1.14	Termination of first period.

##### TRANSFERS TO ARMY RESERVE.

5376	Pte.	Esworthy, L. St. J.	13.12.13	5256	Pte.	Austin, W. A. . .	5.1.14
4390	"	Barlow, T. . . .	14.12.13	5267	"	Roberts, J. F. E.	12.1.14
6651	"	Page, H. W. . . .	14.12.13	5244	"	Houston, E. W.	1.1.14
67	"	Carey, W. . . .	29.12.13	2201	"	Ring, R. . . .	2.1.14
5243	"	Pratt, W. E. . . .	30.12.13	1070	"	Harwood, G. H.	3.1.14
5249	"	Jones, F. . . .	2.1.14	1071	"	Stocker, J. N. . .	3.1.14
5255	"	Fenna, H. . . .	3.1.14	5259	"	High, W. . . .	5.1.14
5253	"	Kelsey, J. A. . . .	4.1.14	5252	"	Ewen, J. . . .	3.1.14

## TRANSFERS TO OTHER CORPS.

5969	Private ..	Cook, R. .. ..	17.12.13	To 18th Hussars.
6852	„ ..	Haworth, F. R. ..	8.1.14	„ 1st Life Guards.

## APPOINTED BUGLER.

6641	Boy ..	Pegg, J. J. .. ..	15.12.13	Vice Munden to the ranks.
6849	„ ..	Ford, H. J. ....	9.1.14	„ Forman „ „

## THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

## FOR QUARTERMASTER-SERJEANT.

11728	S.-Serjt...	Jarvis, T. J.		
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## FOR STAFF-SERJEANT.

12815	Serjeant ..	Burgess, G. ... ..	14050	Serjeant ..	Andrews, W.
18645	„ ..	Rouse, C. E. ... ..	16247	„ ..	Freeman, E. S.

## FOR SERJEANT.

18854	Corporal ..	Forge, C. D.	2147	Corporal ..	Hampson, W. C.
14337	„ ..	Sadler, G.	16442	Lce.-Serjt.	Lawson, W.
19863	„ ..	Mattison, W. H.	18409	Corporal ..	Horsfield, F. M.
18898	„ ..	Green, G. H.	19543	„ ..	Andus, F. E. H.

## FOR CORPORAL.

6291	Private ..	Gunter, J. E.	19167	Private ..	Stokes, H. E.
2018	„ ..	Taylor, W.	1400	„ ..	Bamber, E.
2170	„ ..	Tromans, W. B.	4728	„ ..	James, A.
5241	„ ..	Hollier, F. C.	6679	„ ..	Lomas, R. W.
6018	„ ..	Pilgrim, A. J.	6932	„ ..	Stewart, H. W. M.
15696	„ ..	Page, W. A.	1464	„ ..	Fitzgerald, J.
4406	„ ..	Taylor, E. F.			

## DISEMBARKATIONS FROM ABROAD.

## FROM EGYPT, PER S.S. "OTWAY," DECEMBER 5, 1913.

4427	Private ..	Richards, A. H.		
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## FROM CEYLON, PER S.S. "SYRIA," DECEMBER 9, 1913.

10566	Sjt.-Major	Dring, B. C.		
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## FROM SINGAPORE, PER S.S. "SYRIA," DECEMBER 9, 1913.

11082	Qmr.-Serjt.	Fraser, J.		
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## FROM HONG KONG, PER H.T. "SOMALI," DECEMBER 17, 1913.

9940	Sjt.-Major	Davis, F.	12259	S.-Serjeant	Worswick, J.
18890	Serjeant ..	Moore, J.	17573	Serjeant ..	Harlen, C.
17497	Corporal ..	Genge, F.	1475	Lce.-Corpl.	Bamford, W. J.
1141	Private ..	Dyson, H. A.	1569	Private ..	Farmer, G. L.
1583	„ ..	Elston, S. G.	1652	„ ..	Hare, S.
1798	„ ..	Gilbert, R. R.			

## FROM N. CHINA, PER H.T. "SOMALI," DECEMBER 17, 1913.

15738	Corporal ..	Brough, H.	19385	Corporal ..	Johnson, H.
7270	Private ..	Collier, W. A.	2232	Private ..	Cooke, W. S. A.
4572	„ ..	Dixon, F.	7296	„ ..	Percival, W. A.
1527	„ ..	Way, S. E.			

## FROM MALTA, PER H.T. "SOMALI," DECEMBER 17, 1918.

4353	Private ..	Burrell, B. G.			
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## [FROM SINGAPORE, PER H.T. "SOMALI," DECEMBER 17, 1918.

18433	Serjeant ..	Shaw, J. A.]		18157	Corporal ..	Pruden, A.
1368	Private ..	Bunker, A.		2226	Private ..	Chatting, F. J.
1364	" ..	Glanville, W. E.		1483	" ..	Licence, C.
1099	" ..	Walton, A.				

## FROM CEYLON, PER H.T. "SOMALI," DECEMBER 17, 1918.

17696	Lce.-Serjt.	Collins, S.		17977	Corporal ..	Davis, D.
17826	Private ..	Malone, T.		2010	Private ..	Merriman, P.
1304	" ..	Rowe, C.				

## FROM GIBRALTAR, PER H.M.S. "MONMOUTH," DECEMBER 18, 1918.

18628	Private ..	Pemberton, G.			
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## FROM EGYPT, PER H.T. "DONGOLA," JANUARY 8, 1914.

2159	Private ..	Dixon, A.			
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## EMBARKATIONS FOR ABROAD.

## To JAMAICA, PER S.S. "ORUBA," DECEMBER 31, 1918.

16573	S.-Serjeant	Nichol, R. S.		17272	Serjeant ..	Thain, H. J.
5110	Private ..	Samme, J. E.		5128	Private ..	Dean, P.
5241	" ..	Hollier, F. C.		5463	" ..	Taylor, H. E.
5368	" ..	Bowden, R. J.		5370	" ..	Lawrence, A. E.
5411	" ..	Griffiths, J. L.		5555	" ..	Riordan, J. J.
5852	" ..	Stone, T. G.		5086	" ..	Wickers, C. W. F.

## To GIBRALTAR, PER H.T. "SOMALI," JANUARY 1, 1914.

17520	Corporal ..	Good, C.		5200	Private ..	Breeze, J. H.
5097	Private ..	Woodfield, J. H.		5020	" ..	Randall, F.
5048	" ..	Suter, J. W. P.		5082	" ..	Kelly, J.
5957	" ..	Raymond, G.		5248	" ..	Taylor, A. W.
6498	" ..	Smith, W. F.		5651	" ..	Wakeford, A. J. T.
6016	" ..	Franks, S. W.		5595	" ..	Edwards, P. F.
6242	" ..	Stoddart, A. J.		5024	" ..	Ballan, D. J.

## [To BERMUDA, PER H.T. "SOMALI," JANUARY 1, 1914.

11214	Qmr.-Serjt.	Squire, W. E.		11507	Qmr.-Serjt.	Baxter, D. C.
15648	Serjeant ..	Hill, E. J.		19258	Corporal ..	Burrows, A. W.
5260	Private ..	Bew, A. J.		5154	Private ..	Trotman, F. W.
5388	" ..	Wilkie, W.				

## To BERMUDA, PER S.S. "TUNISIAN," JANUARY 3, 1914.

12235	S.-Serjeant	Burton, C. A.		5112	Private ..	Gregory, E. S. H.
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**NOTES FROM COSHAM.**—Serjeant-Major G. W. Carnell writes: "The festive season at the Alexandra Hospital, Cosham, was spent most pleasantly by both the patients and members of the Corps.

"On Christmas Eve the patients were given tea in the tastefully decorated wards, by the matron and nursing staff; this was followed by a gramophone entertainment and other musical items. The festivities for the patients were continued on Christmas morning by a hearty breakfast, after which a well-attended service was held in the chapel by the Rev. G. H. Colbeck. Dinner was served at 12.30 p.m., consisting of all the customary Christmas fare, and judging by the havoc wrought among the good things provided, was an undoubted success.

"The patients' dinner being happily finished, No. 6 Company, R.A.M.C., commenced



their innings with dinner at 1.30 p.m., at which, as at the meal mentioned above, no quarter was given to the excellently served up viands which the dinner committee had prepared (Corporal Burnhill, Lance-Corporal Reeves, Privates Annett, Dale, Martin, and Churchill).

"During dinner Major E. C. Hayes (in the absence on leave of our commanding officer, Lieutenant-Colonel J. Meek) and officers visited the dining hall, and wished the company the compliments of the season; three hearty cheers were given for the C.O. and officers, R.A.M.C. A photograph showing the dining hall is enclosed.

"In the evening a concert was held in the R.A.M.C. Recreation Room, and an excellent programme carried out.

"Violin duets were given by Masters Brown and Burt, songs by Staff-Serjeant Winton, Serjeant Ford, Privates Annett, Kelly, Watterson, Allcock, and Wood, and recitations by Serjeant Ward and Private Martin.



"A comic boxing sketch was put up by Private Woods and Bugler Hurley, and two turns were given by No. 6 Company, R.A.M.C., Glee Party under the direction of Staff-Serjeant Rolfe.

"The accompaniments were played by Private Laurent, who carried out his part of the programme admirably."

**NOTES FROM WOOLWICH.**—Lieutenant-Colonel T. du B. Whaithe sends us the following extract from the *Kentish Independent* and *Kentish Mail* of December 19, 1913:—

**"A UNIQUE DEMONSTRATION.**

"*Arsenal Men's Farewell to Captain Coates.*—Had a foreign aeroplane been sailing over Woolwich Arsenal on Wednesday evening, the occupants would have thought the millennium had apparently arrived, and that England had forged her swords into ploughshares, for sweet sounds of peace and goodwill were ascending to Heaven from the nation's workshop for making war material.

"The proceedings were, it is believed, absolutely unique in the annals of Woolwich Arsenal, and were caused by the approaching departure of Captain T. S. Coates, R.A.M.C., for India. No man has ever left the Medical Department, or, for that matter, any other department 'inside,' and experienced such a generous, loving,



and novel send-off as that given to the gallant Captain. Permission had been asked and kindly granted to serenade him outside his quarters after work had ceased for the day.

"A company of over a thousand (which would have been considerably augmented had it been more generally known, but the matter had been arranged spontaneously and necessarily quickly) gathered outside the quaint old buildings at the top of Street No. 2. They had a choir gathered together from here, there and everywhere, led by a few trained voices, and from their capital, well-balanced and meritorious performance, no one would have imagined that they were prosaic British workmen, who had come straight from a hard day's toil to unite and lift up their voices to show their appreciation and respect of an English gentleman. They led off (unaccompanied, of course) with the 'Soldiers' Chorus' from 'Faust,' followed by 'The Soldier's Farewell,' winding up with 'Auld Lang Syne,' rendered by all present. The crowd then broke into the time-honoured refrain, 'For he's a jolly good fellow,' with three rousing cheers for Captain Coates, followed by another three for Mrs. Coates.

"The Captain came out to the top of the steps, visibly affected by the genuine and totally unlooked-for appreciation of the huge gathering, and in a few quiet and well-chosen phrases thanked all present, and Arsenal men as a body, for the kind manner in which they had received and treated him whilst 'inside.' He assured them that the years he had been with them had been amongst the happiest of his life, and he would always bear in mind that parting farewell and their token of appreciation.

"A letter was then handed to him, expressing the general regret with which Arsenal men were parting with him, and wishing him 'God speed,' the best of health, and good luck for his future career; whilst a lad handed to Mrs. Coates a bunch of heather.

"So terminated a most happy event, which reflected the utmost credit on all those who arranged and took part in what was a unique occasion."

**NOTES FROM MAURITIUS.**—Serjeant H. E. Tyler writes, under date December 12, 1913: "The past week has been an exceedingly busy one in regard to sport and 'Smokers' for No. 31 Company, R.A.M.C., Mauritius.

"On Wednesday, the 3rd inst., the Company entertained the band of the 2nd Battalion Hampshire Regiment, prior to its departure for India.

"A cricket match was played during the afternoon (a new mat, it might be remarked, made its appearance on this occasion) which resulted in a win for the Corps by 68 runs.

"The scores were as follows:—

31ST COMPANY, R.A.M.C.			BAND, 2ND HANTS.		
Serjt.-Maj. Higdon, c. White, b. Rowe	23		Brown, b. Read	..	1
Lce.-Corpl. Webb, b. Eyles	..	12	Knight, b. Read	..	3
Qtrmstr.-Serjt. Read, b. Roye	..	26	Rowe, c. and b. Read	..	7
Corpl. Franklin, c. Rosier, b. Eyles	..	0	Eyles, run out	..	0
Corpl. Beckett, b. Rowe	..	0	White, b. Read	..	0
Lce.-Corpl. Ellard, b. Eyles	..	19	Carley, c. Ellard, b. Franklin	..	1
Pte. Walsh, l.b.w., b. Rowe	..	0	Bolch, c. Fosh, b. Ellard	..	8
Pte. Fosh, c. Moore, b. Rowe	..	1	Povey, not out	..	3
Lce.-Corpl. Ferguson, b. Rowe	..	0	Rosier, run out	..	8
Pte. Cooney, b. Eyles	..	3	Moore, c. Ellard, b. Webb	..	0
Serjt. Tyler, not out	..	9	Ronnel, c. Fosh, b. Webb	..	2
Extras	..	13	Extras	..	5
Total	..	106	Total	..	38

"The game having finished earlier than was anticipated, a walking football match was got up; this caused plenty of fun and the referee had to make constant use of the whistle. Result: 'honours even.'

"A tea and musical evening followed and so closed a most enjoyable day.

"On Thursday, 4th inst., the Royal Engineers, our old opponents, were entertained at a cricket match and tea, which was enjoyed by all.

"The match resulted as follows:—

R.A.M.C.		ROYAL ENGINEERS.	
Serjt.-Maj. Higdon, c. Wye, b. Read	34	Qtrtmstr.-Serjt. Read, c. Ellard, b. Molyneux	27
Corpl. Webb, c. Hocking, b. Read	6	Spr. Larke, c. Webb, b. Molyneux	2
Pte. Hickey, b. Hocking	30	Spr. Peters, run out	1
Serjt. Tyler, c. and b. Hocking	5	Corpl. Searle, b. Hickey	4
Corpl. Beckett, c. Peters, b. Hocking	3	Corpl. Prior, c. Cooney, b. Molyneux	16
Loc.-Corpl. Ellard, c. Wye, b. Hocking	6	Staff-Serjt. Hocking, b. Hickey	2
Pte. Cooney, c. and b. Hocking	0	Spr. Wye, b. Hickey	4
Pte. Molyneux, c. Prior, b. Hocking	5	Spr. Jales, c. Ellard, b. Hickey	8
Pte. Walsh, b. Hocking	0	Spr. Byrne, h.w., b. Molyneux	3
Corpl. Ferguson, b. Read	6	Spr. Sands, not out	4
Pte. Fosh, not out	0	Spr. Lewis, b. Hickey	0
Extras	10	Extras	5
Total	105	Total	79

"On Saturday, 6th inst., an excellent smoking concert was held in one of the rooms in the Old Brick Block, Curepipe Camp, which was made the occasion of a farewell to the home-going draft of No. 31 Company. The room was tastefully decorated and a stage erected under the supervision of Corporal Chatfield, R.A.M.C.

"The following programme was got through.

#### PART I.

(1) <i>Pianoforte Selection.</i>			
(2) <i>Song</i> .. .. .	'The Girl who loved a Soldier'	..	Corpl. PECKHAM.
(3) <i>Song</i> .. .. .	'On Top'	..	Pte. WARD.
(4) <i>Song</i> .. .. .	Selected	..	Capt. MACARTHUR.
(5) <i>Song</i> .. .. .	'Land of Roses'	..	Pte. WALSH.
(6) <i>Song</i> .. .. .	'Victoria Cross'	..	Pte. FOSH.
(7) <i>Song</i> .. .. .	'Why do the Girls run after Me?'	..	Pte. HARRIS.
(8) <i>Song</i> .. .. .	'Alice, where art thou?'	..	Corpl. WEBB.
(9) <i>Song</i> .. .. .	'Isle of Mauroo'	..	Serjt. RILEY.
(10) <i>Song</i> .. .. .	'Bugle and Sword'	..	Major WALKER.
(11) <i>Song</i> .. .. .	'Miserable Man'	..	Spr. LEWIS.
(12) <i>Song</i> .. .. .	'Ding-Dong'	..	Corpl. FRANKLIN.
(13) <i>Song</i> .. .. .	'Up her way next week' ( <i>encore</i> )	..	"
(14) <i>Song</i> .. .. .	"When the Sheep are in the Fold, Jenny, dear"	..	Serjt. LAXTON.

#### PART II.

(15) <i>Pianoforte Selection.</i>			
(16) <i>Song</i> .. .. .	'My Old Shakoo'	..	Capt. MACARTHUR.
(17) <i>Song</i> .. .. .	'I sang before the Kaiser'	..	Spr. LEWIS.
(18) <i>Song</i> .. .. .	'Cheer, Boys, Cheer'	..	Staff-Serjt. WALLS.
(19) <i>Song</i> .. .. .	'The Old Tin Can'	..	Spr. RAE.
(20) <i>Song</i> .. .. .	'John Peel'	..	Serjt. RILEY.
(21) <i>Song</i> .. .. .	'It all depends upon the Gee-Gee'	..	Pte. FOSH.
(22) <i>Song</i> .. .. .	Selected	..	Capt. MACARTHUR.
(23) <i>Song</i> .. .. .	'I don't care what becomes of Me'	..	Spr. RAE.
(24) <i>Song</i> .. .. .	'Philadelphia'	..	Spr. WELCH.
(25) <i>Song</i> .. .. .	'Sailing'	..	Spr. DOWLING.
(26) <i>Song</i> .. .. .	'Who were you with last night?'	..	Spr. LEWIS.
(27) <i>Speech</i> .. .. .	'The Guests'	..	Serjt.-Maj. HIGDON.

"Staff-Serjeant Walls occupied the chair.

"Among the officers present were Majors Crawford (R.A.M.C.) and Walker (R.G.A.), Captains MacArthur (R.A.M.C.), Keene and Clarke (R.G.A.).

"Various toasts were given during the evening.

"In proposing the toast of the home-going draft, the chairman regretted that they were unable to welcome the new draft on this occasion, and said he felt certain that those remaining behind would agree with him when he said that they were extremely sorry the members of the old draft were leaving. They would particularly feel the

loss of their Commanding Officer as he has been a very keen supporter of the Company Sports Club, of which he was President. All joined in thanking him for what he had done and wished Major and Mrs. Crawford the best of luck in the future. The health of the old draft was then drunk with musical honours. Major Crawford returned thanks in a suitable speech.

"The Company broke up at 12 midnight.

"On Thursday, 9th inst., the draft, consisting of 2 Officers, 1 W.O. and 11 other ranks left to embark for England per H.M.H.T. 'Soudan,' and were accompanied from the camp to the railway station, Curepipe, by the Creole band, to the strains of such music as 'Home, Sweet Home,' 'The girl I left behind me,' &c."

**NOTES FROM CAIRO.**—Lieutenant Kinsella, Quartermaster No. 33 Company, R.A.M.C., writes: "On October 9, the annual cricket match, officers and sergeants v. remainder of company, was held on the citadel ground, resulting in a win for the former by 46 runs. After the match high tea was served in the company dining hall, at which all ranks did justice to the good things provided.

"At 9 p.m. an open-air smoking concert was held in the hospital garden, which, with its hundreds of lights artistically distributed amongst the foliage, presented quite a fairy-like scene.

"All our officers, also the matron and sisters, were present, and we were glad to welcome the officers of our neighbours, the Suffolk Regiment, to whom we were much indebted for their kindness in lending their excellent string band.

"The programme was as follows:—

"(By kind permission of Lieutenant-Colonel W. B. Wallace and Officers, the String Band of the 1st Battalion Suffolk Regiment formed the Orchestra.)

"Conductor—Mr. B. BEALE, Bandmaster.

- |                           |   |                                |
|---------------------------|---|--------------------------------|
| (1) March .. ..           | "The Peacemaker" .. ..                  | ORCHESTRA.                     |
| (2) Comic Song .. ..      | "We all went to Leicester Square" .. .. | Pte. NYE.                      |
| (3) Song .. ..            | "The Diver" .. ..                       | Pte. SCHÖENTHAL.               |
| (4) Rag .. ..             | "Everybody's doing it" .. ..            | Pte. FERDINANDO.               |
| (5) Ballad .. ..          | "Sunshine and Rain" .. ..               | Mrs. MART, A.O.C.              |
| (6) Character Duet .. ..  | "The Coster and the Swell" .. ..        | Ptes. WRIGHT and FERDINANDO.   |
| (7) Pianoforte Solo .. .. | Caprice—"My Fancy" .. ..                | Master KINSELLA.               |
| (8) Song .. ..            | "The last Parade" .. ..                 | Lce.-Corpl. MILES (Suffolks).  |
| (9) Comic Song .. ..      | "Harmony Hall" .. ..                    | Mr. BOYD.                      |
| (10) Ballad .. ..         | "I'll sing Thee Songs of Araby" .. ..   | Mr. MART, A.O.C.               |
| (11) Comic Duet .. ..     | "Flip-Flap" .. ..                       | Corpl. BEVAN and Pte. WILKINS. |

"(Interval of fifteen minutes.)

- |                               |  |                                |
|-------------------------------|--|--------------------------------|
| (12) Valse .. ..              | "Vision d'Amour" .. ..                   | ORCHESTRA.                     |
| (13) Humorous Song .. ..      | "Visiting" and "At Home" .. ..           | Miss AITKEN.                   |
| (14) Ballad .. ..             | "Beautiful Garden of Roses" .. ..        | Pte. BURRELL.                  |
| (15) Comic Song .. ..         | "I want to be pally with Everyone" .. .. | Pte. WILKINS.                  |
| (16) Ballad .. ..             | "Good-bye" (Tosti) .. ..                 | Mrs. MART, A.O.C.              |
|                               | (Violin obligato—Pte. POOSON, Suffolks.) |                                |
| (17) Comic Song .. ..         | "What will England do then?" .. ..       | Pte. ROONEY (Gordons).         |
| (18) Cello Solo .. ..         | "Reverie" .. ..                          | Lce.-Corpl. DOUBLE (Suffolks). |
| (19) Humorous Interlude .. .. | "Funny Phrases" .. ..                    | Mr. BOYD.                      |
| (20) Song .. ..               | Selected .. ..                           | Miss BURKE.                    |
| (21) Song .. ..               | "The Wonders of the Deep" .. ..          | Lce.-Corpl. MILES (Suffolks).  |
| (22) Two-step .. ..           | "Moonstruck" .. ..                       | ORCHESTRA.                     |
|                               | "Regimental March."                      |                                |
|                               | "Khedivial Anthem."                      |                                |
|                               | "GOD SAVE THE KING."                     |                                |

"Manager—Lieutenant (Quartermaster) KINSELLA, R.A.M.C.

"Accompanist—Private FULLER (Gordons).

"During the past month detachments of the company have been, in turn, in camp at Mena for field training (for the first time in this country); this will now, doubtless, become an annual fixture, much to the benefit of all ranks.

"On December, 18, the officers of the Corps in Egypt gathered to dinner at the

Turf Club to say farewell to Colonel A. F. Russell, C.M.G., who much to our regret is retiring, and to welcome his successor, Colonel N. Manders, who has joined from the Curragh.

"Lieutenant-Colonel Knaggs, Commanding No. 33 Company, presided, and in some well-chosen remarks expressed our regret at losing the D.D.M.S., sentiments which the company emphasized with musical honours.

"Colonel Russell, replying in an interesting speech, traced the evolution of the Corps since his early days, and added, when thanking all for their loyal co-operation and service, that 1913 has seen less sickness amongst the Army of occupation than any previous year.

"We were also sorry to say 'good-bye' to Captain Chalk, Quartermaster, who has tired of the 'Donkey Boy,' and goes home on exchange. Maleesh!

"Those present included Colonels Russell and Manders, Lieutenant-Colonel Knaggs; Majors Douglas, V.C., Ellery, and Potter; Captains Elvery, Leeson, Field and Chalk; Lieutenants Chambers, Biggar and Kinsella.

"An excellent dinner and a most pleasant evening will long remain in the memories of those who were present."

**NOTES FROM SCUTARI.**—Serjeant J. Mulcahy, writes, dated January 4, 1914: "Far away in this mountainous retreat of Albania, the small detachment of 17 N.C.O.'s and men of the Royal Army Medical Corps forming Section 'B,' Field Ambulance, celebrated the festive season in a right royal manner, and all without exception thoroughly enjoyed themselves both on the Christmas Day and New Year's Eve. The dining room of the Detachment was very tastefully decorated, the ceiling and walls were surrounded with blankets, having small pieces of wool attached, which produced the appearance of falling snowflakes in the room.

"The usual mottoes were neatly arranged: one was to wish our Commanding Officer (Major Brodribb) and Lieutenant Gaunt 'the compliments of the season,' another to our 'absent friends,' while in a very conspicuous place was the outline of the H.T.S. 'Rewa' in wool, with the wording underneath 'We all go the same way home.'

"The whole of the Detachment sat down to a splendid Christmas dinner at 1.30 p.m., for which all thanks are due to our superintendent cook (Corporal Price), and needless to say each and everyone of us did full justice to it. During the dinner hour Major Brodribb and Lieutenant Gaunt paid us a visit, and after exchanging Christmas greetings drank our health; this was responded to by our singing 'They are jolly good fellows.'

"In the evening a very successful concert was arranged, to which about thirty guests were invited, commencing at 7.30 p.m.

"The Band of the 2nd West Yorkshire Regiment gave a rendering of some beautiful pieces of music, and it would be difficult indeed to single out one good singer from another, all those taking part distinguishing themselves. At 11.30 p.m. 'Auld Lang Syne' was sung, followed by 'The National Anthem,' after which all left, having spent what was styled 'the finest Christmas Day for many a year.'

"On New Year's Eve we saw the old year out and the new one in, with another very successful concert commencing at 9 p.m.

"The Band of the 2nd West Yorkshire Regiment also acquitted themselves with great credit.

"At midnight all joined in singing 'the old year out and the new one in,' followed by 'Auld Lang Syne' to the accompaniment of the merry chiming of the bells.

#### "PROGRAMME—NEW YEAR'S EVE.

- |                                    |                               |                           |
|------------------------------------|-------------------------------|---------------------------|
| (1) <i>Toast</i> .. .. .           | 'The King.'                   |                           |
| (2) <i>March</i> .. .. .           | 'Jolly Sailors'               | BAND.                     |
| (3) <i>Song</i> .. .. .            | 'Loch Lomond'                 | Pte. JOHNSTONE, R.A.M.C.  |
| (4) <i>Song</i> .. .. .            | 'You've got a long way to go' | Pte. MORRISON, R.A.M.C.   |
| (5) <i>American Sketch</i> .. .. . | 'Swanee River'                | BAND.                     |
| (6) <i>Song</i> .. .. .            | 'My Latch-key'                | Pte. LATIMER.             |
| (7) <i>Song</i> .. .. .            | 'We are Brothers'             | Pte. HADFIELD.            |
| (8) <i>Song</i> .. .. .            | 'Poison'                      | Staff-Serjt. VINE, A.S.C. |
| (9) <i>Two-step</i> .. .. .        | 'Cavito'                      | BAND.                     |

"(Interval of fifteen minutes. Refreshments.)

- (10) *Song* .. .. 'My Thoughts are always of You' .. Pte. LATIMER.  
 (11) *Toast* .. .. 'Our Guests.'  
 (12) *Song* .. .. 'Jack's fond of the Girls' .. Pte. MORRISON.  
 (13) *Valse* .. .. 'Dreaming' .. .. BAND.  
 (14) *Song* .. .. 'Wild Irish Boy' .. Pte. JOHNSTONE.  
 (15) *Response* .. .. .. VISITORS.  
 (16) *Song* .. .. 'We are two Lords' .. Corps. PRICE and PEARCE.  
 (17) *Valse* .. .. 'Quaker Girl' .. .. BAND.  
 (18) *Sketch* .. .. 'Duffy' .. Ptes. LATIMER and MORRISON.  
 (19) *Song* .. .. 'My Home is far away' .. Pte. LATIMER.  
 (20) *Sketch* .. .. 'Down South' .. .. BAND.

"The Detachment has played several games of football against the Germans, French, and Austrians, on separate occasions, and has been victorious on each occasion."

**NOTES FROM DELHI.**—Lieutenant-Colonel A. P. Blenkinsop, Assistant Director of Medical Services (British Service) writes as follows, dated December 22, 1913 :—

"*Appointments.*—Captain A. W. Byrne has been appointed Deputy Assistant Director, Medical Services (Sanitary), 3rd (Lahore) Division.

"*Exchange.*—An exchange for duty in India between the following officers has been effected :—

"Lieutenant-Colonel H. E. Winter to the 6th (Poona) Division, from the Home Establishment vice Lieutenant-Colonel G. A. T. Bray, from the Home Establishment.

"*Languages.*—Captain A. Irvine-Portescue has been selected by the War Office to proceed to Japan for a three years' course of study of the Japanese language.

"*Leave.*—General leave ex-India to the undermentioned officers has been concurred in :—

"Captain R. M. Dickson, six months, from April 1, 1914, to September 30, 1914.

"Captain F. J. Stuart, six months, from January 10, 1914, to July 9, 1914.

"Captain W. A. Spong, six months and two weeks, from March 15, 1914, to September 28, 1914.

"*Specialists.*—The following officers have been appointed specialists in the subject and Division noted against them :—

"Major N. H. Ross, Prevention of Disease, and appointed to the Brigade Laboratory, Fyzabad.

"Major H. F. Shea, Advanced Operative Surgery, 3rd (Lahore) Division.

"Captain H. W. Russell, Prevention of Disease, and appointed to the Brigade Laboratory, Ambala.

"Captain G. G. Collett, Dermatology, 7th (Meerut) Division."

### SPECIAL RESERVE OF OFFICERS.

#### ROYAL ARMY MEDICAL CORPS.

Major Harold E. Mortis resigns his commission, and is granted permission to retain his rank and wear the prescribed uniform, dated January 3, 1914.

The undermentioned to be Lieutenants (on probation) : Cadet Staff Serjeant Owen Hairsine from the University of London Contingent, Officers' Training Corps, dated November 29, 1913 ; Cadet Staff-Serjeant Thomas Ottiwill Graham, M.D., F.R.C.S.I., from the Dublin University Contingent, Officers' Training Corps, dated December 4, 1913. Cadet Serjeant Thomas Wilson Wylie, from the Glasgow University Contingent, Officers' Training Corps, dated December 19, 1913 ; Cadet Serjeant Alexander John Gibson, from the Glasgow University Contingent, Officers' Training Corps, dated December 22, 1914.

### TERRITORIAL FORCE.

#### TERRITORIAL FORCE DECORATION.

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned Officers of the Territorial Force, who have been duly recommended for the same under the terms of the Royal Warrant, dated August 17, 1908.

#### ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel Sydney Arthur Copeman, M.D., F.R.S., Sanitary Officer of the 1st London Territorial Division.

- 2nd East Anglian Field Ambulance.*—Lieutenant-Colonel John Herbert Stacy.  
*1st North Midland Field Ambulance.*—Quartermaster and Honorary Major William Millington Moreton.  
*1st South Midland Field Ambulance.*—Transport Officer and Honorary Major George Henry Dawes.  
 Major John Henry Harris, M.D., attached to the 4th Wessex Brigade, Royal Field Artillery.  
 Major Francis James Warwick, M.B., attached to the 8th (Cyclist) Battalion, the Essex Regiment.  
 Major Henry Dutch, attached to the 4th (City of London) Battalion, the London Regiment (Royal Fusiliers).

#### ROYAL ARMY MEDICAL CORPS.

- 4th Southern General Hospital.*—Henry George Pinker to be Captain, whose services will be available on mobilization, dated October 21, 1913.  
*3rd East Anglian Field Ambulance.*—Lieutenant William I. Cowell to be Captain, dated November 10, 1913.  
*Northumbrian Divisional Clearing Hospital.*—Lieutenant-Colonel (Honorary Lieutenant in the Army) John Clay, M.B., F.R.C.S., from the 1st Northumbrian Field Ambulance, to be Lieutenant-Colonel, dated December 20, 1913.  
*3rd Southern General Hospital.*—Captain William E. Robinson, M.D., ceases to hold a commission in the Territorial Force, dated January 1, 1914.  
*2nd East Anglian Field Ambulance.*—Captain James M. G. Bremner, M.B., to be Major, dated November 5, 1913.  
*2nd Western General Hospital.*—Lieutenant-Colonel Graham Steell, M.D., resigns his commission, dated December 24, 1913.  
*1st London Divisional Clearing Hospital.*—Major Alexander Barclay Lyon, M.D., from the List of officers attached to Units other than Medical Units, to be Lieutenant-Colonel, dated November 28, 1913.  
*2nd East Lancashire Field Ambulance.*—Supernumerary Captain George Ashton, M.D., ceases to serve with the No. 18 Field Ambulance, Royal Army Medical Corps, Special Reserve, and is restored to the establishment, dated January 7, 1914.  
*3rd North Midland Field Ambulance.*—William Boyd, M.D., to be Lieutenant (to be supernumerary), dated November 27, 1913.  
*3rd London General Hospital.*—Captain Frederick R. Miller to be Major, dated January 7, 1914.  
*Highland Clearing Hospital.*—Alexander Gibbon to be Quartermaster, with the honorary rank of Lieutenant, dated January 7, 1914.  
*West Lancashire Clearing Hospital.*—Lieutenant-Colonel William Baron Cockill, M.D., from the 3rd West Lancashire Field Ambulance, to be Lieutenant-Colonel, dated December 1, 1913.  
*South Midland Clearing Hospital.*—Major Seymour Gilbert Barling, from the 1st Southern General Hospital, to be Lieutenant-Colonel, dated January 7, 1914.  
*3rd North Midland Field Ambulance.*—Lieutenant Martin Hallam resigns his commission, dated January 21, 1914.  
*1st South Midland Field Ambulance.*—Lieutenant Edward J. Boome, M.B., to be Captain, dated August 19, 1913.  
*North Midland Clearing Hospital.*—Lieutenant-Colonel William Pemberton Peake, from the 2nd North Midland Field Ambulance, to be Lieutenant-Colonel, dated January 21, 1914.  
*West Riding Clearing Hospital.*—Lieutenant-Colonel Algernon Edward Luke Wear, M.D., from the 1st West Riding Field Ambulance, to be Lieutenant-Colonel, dated January 21, 1914.  
*Welsh Clearing Hospital.*—Major Conrad Theodore Green, from the List of Officers attached to Units other than Medical Units, to be Lieutenant-Colonel, dated November 12, 1913.  
*Notts and Derby Mounted Brigade Field Ambulance.*—Lieutenant-Colonel Lewis W. Pockett, M.D., resigns his commission, and is granted permission to retain his rank and wear the prescribed uniform, dated January 24, 1914.



*2nd East Anglian Field Ambulance.*—Lieutenant-Colonel John H. Stacey resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated January 24, 1914.

*1st North Midland Field Ambulance.*—John Caldwell Grieve, M.B., to be Lieutenant, dated January 1, 1914.

*1st West Riding Field Ambulance.*—Captain Alexander D. Sharp to be Major, dated January 24, 1914.

*2nd Welsh Field Ambulance.*—Arthur Frederick Bernard Shaw, M.B., to be Lieutenant, dated December 8, 1913.

*Welsh Clearing Hospital.*—Captain Ashley Bird, from the List of Officers attached to Units other than Medical Units, to be Captain, dated December 20, 1913.

#### SANITARY SERVICE.

Major Harold M. Richards, M.D., resigns his commission, dated January 7, 1914.

#### OFFICERS ATTACHED TO OTHER UNITS.

George Henderson to be appointed Lieutenant, dated November 6, 1913.

Captain (Honorary Captain in the Army) George Black, M.B., to be Major, dated October 28, 1913.

Captain James A. Taylor, M.B., resigns his commission, dated December 20, 1913.

Captain Edward R. Williams resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated December 24, 1913.

Major Richard C. M. Pooley is retired, under the conditions of paragraph 116 of the Territorial Force Regulations, and is granted permission to retain his rank and to wear the prescribed uniform, dated December 24, 1913.

Lieutenant Andrew G. T. Hanks to be Captain, dated October 6, 1913.

John Earnsclough Brydon, M.B., to be Lieutenant, dated January 3, 1914.

Lieutenant William C. F. Harland, M.B., to be Captain, dated October 6, 1913.

Captain George McKellar, M.D., resigns his commission, dated January 7, 1914.

George Paul Anning to be Lieutenant, dated November 22, 1913.

William Douglas Frew to be Lieutenant, dated December 1, 1913.

John Saffley, M.B., to be Lieutenant, dated January 7, 1914.

Captain William A. Gibb, M.D., to be Major, dated December 3, 1913.

Lieutenant Alfred S. Bruzard to be Captain, dated December 4, 1913.

#### SUPERNUMERARY FOR SERVICE WITH THE OFFICERS' TRAINING CORPS.

The undermentioned Lieutenants serving with the Royal College of Surgeons in Ireland Contingent, Senior Division, Officers' Training Corps, resign their commissions, dated January 7, 1914.

Thomas Thomson.

Henry Stokes.

#### UNATTACHED LIST FOR THE TERRITORIAL FORCE.

Major Evelyn John Robert Evatt, M.B., from the Royal Army Medical Corps, Territorial Force (attached to the 2nd Welsh Brigade, Royal Field Artillery), to be Major, and is appointed to command the Royal College of Surgeons in Ireland Contingent, Senior Division, Officers' Training Corps, dated November 11, 1913.

#### QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

*Postings and Transfers.*—Sisters: Miss E. B. Darnell, to Devonport, from London; Miss D. M. Taylor, to Colchester, from Cosham; Miss S. Smyth, to Cosham, from the Royal Military College; Miss M. Denne, to the Royal Military College, from Colchester; Miss M. German, to Alexandria, from Cairo; Miss F. E. Manfield, to Cairo, from Alexandria. Staff Nurse: Miss C. C. M. Gibb, to Netley, on return from Hong Kong.

### ARMY MEDICAL CORPS, AUSTRALIA.

We have to thank Lieutenant-Colonel C. H. W. Hardy and the officers of the 30th Army Medical Corps (Light Horse Field Ambulance) for a tasteful New Year's card containing illustrations of the Unit's field training.

# ROYAL ARMY MEDICAL COLLEGE.

LIST OF BOOKS ADDED TO THE LIBRARY DURING THE MONTHS OF  
OCTOBER, NOVEMBER, AND DECEMBER, 1913.

Title of Work and Author	Edition	Date	How obtained
Manuel d'Histologie Pathologique. By Cornil and Ranvier. 3 vols.	3rd	1901-07	Library Grant.
Dictionnaire de Physiologie. Par C. Richet. Vol. ix		1913	" "
Panama and what it Means. By John Foster Fraser		1913	" "
Report on the Examination of Officers for Promotion, held in May, 1913			Commandant's Office.
Archives of the Middlesex Hospital. Vol. xxx. 12th		1913	" "
Report from the Cancer Research Laboratories			
Archives of the Middlesex Hospital. Clinical Series. No. 12. Neurological Number. Edited by H. C. Thomson, M.D.		1913	" "
Report on Sanitary Measures in India in 1911-1912			
Report on Higher Education in the State of New York, July 31, 1912		1913	" "
The British Guiana Medical Annual for 1912. Edited by K. S. Wise, M.B., B.S., B.Sc.		1913	" "
Report of an Enquiry into the Prevalence of Malaria in Kosi (District Muttra), 1910. By Capt. J. D. Graham, I.M.S.		1910	" "
An Enquiry into the Prevalence of Malaria in Kaisana (District Muzappanagar), 1910. By Capt. J. D. Graham, I.M.S.		1910	" "
Note on Mosquito Larvæ-Destroying Flies in the United Provinces. By Major J. D. Graham, I.M.S.		1913	" "
Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India. New Series. No. 63		1913	" "
Studies in the Mouth-parts and Sucking Apparatus of the Blood-sucking Diptera. No. 4: The Comparative Anatomy of the Proboscis in the Blood-sucking Muscidae. By Capt. F. W. Cragg, M.D., I.M.S.			
The Celebration of the Two Hundred and Fiftieth Anniversary of the Royal Society of London, July 15-19, 1912		1913	" "
Medizinal-Berichte über die Deutschen Schutzgebiete. 1910-1911		1913	Librarian, War Office.
Statistical Report of the Health of the Navy. 1912		1913	D.G. Naval Medical Department.
The Westminster Hospital Reports, 1911-1912. Vol. xviii. Edited by E. Rock Carling and Purves Stewart		1913	Westminster Hospital. , 1
Disturbances of the Visual Functions. By Prof. W. Lohmann. Translated by A. MacNab, M.B.		1913	Editor, Journal.
The Bradshaw Lecture on the Biology of Tumours. By C. Mansell Moullin, M.A., M.D.		1913	" "
Sleeping Sickness in the Island of Principe. By Surg.-Capt. B. F. Bruto Da Costa. Translated by Lieut.-Col. J. A. Wylie, Indian Army (Ret.)		1913	" "
The Soldier's Foot and the Military Shoe. By E. L. Munson, A.M., M.D.		1912	" "
Manual of Operative Surgery. By J. Fairbairn Binnie, A.M., C.M.	6th	1913	" "

LIST OF BOOKS ADDED TO THE LIBRARY—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Compendium of the Pharmacopœias and Formularies (Official and Unofficial), with Practical Aids to Prescribing and Dispensing. By C. J. S. Thompson	4th	1913	Editor, Journal.
W. Roth's Jahresbericht über das Militär-Sanitätswesen für 1912		1913	" "
The Lister Institute of Preventive Medicine. Collected Papers. No. 9, Part I: Bacteriological, Pathological and Epidemiological Papers. No. 9, Part II: Physiological, Zoological and Bio-Chemical Papers		1913	" "
Indian Home Nursing. By Major R. J. Blackham, C.I.E., R.A.M.C.		1913	" "
Hints for Regimental Medical Officers of the Territorial Force. By Capt. M. F. Grant, R.A.M.C.		1913	" "
A Manual of Practical Chemistry for Public Health Students. By A. W. Stewart, D.Sc.		1913	" "
Twelfth Annual Report of the Institute for Medical Research, Kuala Lumpur, Federated Malay States. 1912		1913	" "
The Administrative Control of Small-pox. By W. McWanklyn, B.A.		1913	" "
Practical Bacteriology, Blood Work, and Animal Parasitology. By E. R. Stitt, M.D.	3rd	1913	" "
A Description of the Imperial Bacteriological Laboratory, Muktesar: its Work and Products. By Major J. D. E. Holmes, M.A.		1913	" "
Proceedings of the Canal Zone Medical Association Isthmian Canal Commission for the half-year April to September, 1912. Vol. v. Part I			
A Manual of Venereal Diseases. By Officers R.A.M.C. Revised and largely re-written by Major L. W. Harrison, R.A.M.C.	2nd	1913	Presented by Major C. E. Pollock, R.A.M.C.
A Hygiene Interpretation of the Food supplied the United States Army in the Field, as at present authorized. By A. A. Woodhall. (Pamphlet.)		1913	Presented by Lieut.-Col. G. E. Twiss, R.A.M.C. (Ret.).
Lieut.-Colonel John Shaw-Billings, U.S. Army (Retired). By Brig.-General A. A. Woodhall, U.S. Army (Retired). (Reprint.)		1913	" "

ROYAL ARMY MEDICAL COLLEGE,  
January 1, 1914.

## ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON MONDAY,  
JANUARY 19, 1914, AT 2.30 P.M.

*Present.*

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., D.G.A.M.S.  
Chairman, in the Chair.

Surgeon-General W. Donovan, C.B.

Colonel B. Skinner, M.V.O.

Colonel E. H. Lynden-Bell.

Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

Lieutenant-Colonel E. M. Pilcher, D.S.O.

Captain W. Benson.

Captain F. Crookes.

Captain W. Benson took his seat on the Committee as Band-President vice Captain L. Cotterill.

A letter of apology for absence was read from Captain Wright.

(1) The Minutes of the last meeting were read and confirmed, subject to some alteration in the wording of Minute 7, suggested by Colonel Skinner.

(2) It was noted that the following grants were received from Companies for the General Relief Fund during the last quarter :—

No. 4 and 5 Company, Netley	..	..	..	£5	0	0
" 8 " York	..	..	..	1	10	0
" 11 " Dover	..	..	..	10	0	0
" 13 " Edinburgh	..	..	..	5	5	0
" 19 " Chester	..	..	..	3	0	0
" 22 " Capetown	..	..	..	5	0	0
" 23 " Pretoria	..	..	..	5	0	0
" 24 " Tempe	..	..	..	10	0	0
" 25 " Bermuda	..	..	..	2	2	0
" 27 " Hong Kong	..	..	..	2	0	0
" 31 " Mauritius	..	..	..	2	0	0
" 33 " Egypt ..	..	..	..	6	0	0
" 35 " London	..	..	..	5	0	0
Serjeants' Mess, Tempe	..	..	..	58	14	11
				<hr/>		
				£120 11 11		

And further, that the following total grants were received during the year 1913 from Companies for the General Relief Fund :—

Company	£	s.	d.	Company	£	s.	d.
1, 2 and 3 Aldershot ..	60	0	0	25 Bermuda ..	2	2	0
4 and 5 Netley ..	5	0	0	26 Ceylon ..	Nil		
6 Cosham ..	5	0	0	27 Hong Kong £2 (Ser-			
7 Devonport ..	5	0	0	jeants' Mess £2) ..	4	0	0
8 York ..	1	10	0	28 Gibraltar ..	3	0	0
9 Colchester ..	2	2	0	29 Jamaica ..	Nil		
10 Chatham ..	1	0	0	30 Malta ..	10	0	0
11 Shorncliffe ..	10	0	0	31 Mauritius ..	2	0	0
12 Woolwich ..	10	0	0	32 Singapore ..	Nil		
13 Edinburgh ..	5	5	0	33 Cairo ..	6	0	0
14 Dublin ..	5	0	0	35 London (Grosvenor			
15 Belfast ..	Nil			Road) ..	5	0	0
16 Cork ..	3	0	0	Camp of Instruction,			
17 Curragh ..	4	0	0	Longmoor ..	15	0	0
18 London (Roches-				Camp of Instruction,			
ter Row) ..	2	0	0	Tidworth ..	20	0	0
19 Chester ..	3	0	0	A. T. A. Aldershot ..	20	0	0
20 Tidworth ..	21	0	0	No. 3 Field Ambulance,			
22 Wynberg ..	5	0	0	Aldershot ..	1	5	0
23 Pretoria ..	5	0	0	<hr/>			
24 Tempe £10 (Ser-				£309 18 11			
jeants' Mess,				<hr/>			
£58 14 11) ..	68	14	11				

(3) A sum of £34 Os. 8d. was sanctioned for grants made from the General Relief Fund during the quarter ending December 31, 1913. A list of recipients is appended to these proceedings.

(4) The Aldershot Band Accounts were considered and passed, and are attached hereto.

A sum of £110 was voted for the current quarters' expenses.

(5) The accounts of the R.A.M.C. Fund which had been duly audited, were considered and passed: they are attached to these proceedings. The Secretary drew attention to the fact that 188 officers of the Corps on the active list do not subscribe to the Fund, and that several officers when proceeding on a tour of service abroad stop their subscriptions. It was decided to discuss the matter at the next committee meeting.

It was resolved that a sum of £800 from the R.A.M.C. Fund shall be invested at once, as follows:—

£400 in Caledonian Railway 4 per cent Preference Stock

£400 in North British Railway 4 per cent Preference Stock

in the ex-officio names of the Director-General, A.M.S., the Commandant of the R.A.M. College, and the Deputy Director of Medical Services, London District.

Also that a sum of £500 from the General Relief Fund shall be invested by the General Relief Trustees in

East India Railways 3½ per cent Debenture Stock.

(6) The following report of the sub-committee for allocating the votes of the Fund for the Royal School for Officers' Daughters, Bath, was adopted.

PROCEEDINGS OF THE SUB-COMMITTEE FOR THE ALLOCATION OF VOTES FOR THE ROYAL SCHOOL, BATH, HELD AT THE WAR OFFICE ON NOVEMBER 17, 1913.

*Present.*

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S.

Colonel E. H. L. Lynden-Bell.

Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

The Secretary.

Before proceeding to the allotment of votes, it was decided to adopt a policy for the guidance of the sub-committee in distribution of the votes of the Fund.

It was resolved that the following factors should be observed in allocating the votes:—

(i) That only daughters of officers of the Regular Army, British Service, should be supported.

(ii) That the order of precedence in allotting the votes shall be (a) daughters of officers of the R.A.M.C.; (b) daughters of officers of the British Service other than the R.A.M.C.

The sub-committee acting on the above policy proceeded to give sixty votes to each of the following candidates:—

(a) Margaret Wilson.

(b) Evelyn Platt.

(c) Margaret Parkyn.

(d) Maureen Welman.

(7) A sum of £2 was sanctioned for payment to Colonel Skinner for the purchase of an engraving of Sir John Webb, who was D.G. Ordnance Medical Department, and served in Holland in 1794, and for a small stipple of John Rush (about 1802) who was Inspector-General of Regimental Hospitals.

(8) It was resolved that a donation of £5 should be given to the Army and Navy Male Nurses' Co-operation for 1914.

(9) Colonel A. Peterkin was elected a member of the Committee to represent retired officers vice Lieutenant-Colonel E. M. Wilson whose four years' tenure now expires.

(10) It was noted that the R.A.M.C. Employment Branch at the Record Office, Aldershot, had found employment for thirty-six N.C.O.s and men during the year 1913 as follows:—

Dispensers .. .. .	9
Sanitary inspectors .. .. .	8
Clerks .. .. .	2
Storekeepers .. .. .	2
Laboratory attendants .. .. .	2
Sick pay attendants .. .. .	8
Valets and nurses .. .. .	8
Porters .. .. .	5
Pages and cooks .. .. .	2

(11) Sanction was given for girl Gardinor to remain at the Royal School for Soldiers' Daughters at Hampstead, for an extra six months.

(12) A letter was read from Lieutenant-Colonel Burtchaell, asking whether the R.A.M.C. Fund could pay the subscriptions for officers and men of the Corps to the Army Athletic Association.

It was resolved to refer the matter to a Sub-Committee consisting of Surgeon-General W. Donovan, C.B., Colonel B. Skinner, M.V.O., and Captain Wright, for consideration and report. Colonel Skinner undertook to convene and arrange the meetings.

(13) Lieutenant-Colonel F. W. H. Davie Harris was re-elected Secretary for a period of three years—to June, 1917.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*

124, Victoria Street, S.W.

*Secretary.*

### ROYAL ARMY MEDICAL RELIEF FUND.

#### LIST OF RECIPIENTS OF GENERAL RELIEF FOR THE QUARTER ENDING DECEMBER 31, 1913.

Name	Age	District	Grant	Total	Remarks
Child, W.	.. — ..	Aldershot	.. 13s. ..	£17 13s. ..	Authorised by the Committee.
Mrs. R. G.	.. 43 ..	Colchester	.. £2 ..	£2 ..	Partial Destitution.
Mr. H. H.	.. 22 ..	Chatham	.. 2 ..	2 ..	.. " " ..
Mr. A. M.	.. 59 ..	Colchester	.. 4 ..	4 ..	.. Unable to work; lost one leg.
Mr. P. H.	.. 29 ..	Chester	.. 3 ..	6 ..	.. Destitution; four children.
Mrs. E. K. M.	.. 42 ..	Devonport	.. 2 ..	7 ..	.. Insufficient means.
Mr. J. W. G.	.. — ..	London	.. 27s. 8d. ..	27s. 8d. ..	.. Fares of family to Athlone.
Mr. J. M. L.	.. 59 ..	Edinburgh	.. £4 ..	£4 ..	.. Destitution.
Hilda M.	.. 14 ..	Portsmouth	.. 4 ..	8 ..	.. Sanctioned by the Committee, April, 1913.
Mrs. E. A.	.. 44 ..	Netley	.. 3 ..	25 ..	.. Sickness.
Mr. W. R. M.	.. — ..	London	.. 1 ..	1 ..	.. Destitution.
Mrs. A. H.	.. 42 ..	Devonport	.. 3 ..	9 ..	.. Poverty; two children to support.
Mr. J. M.	.. 63 ..	Chatham	.. 2 ..	2 ..	.. Ill health.
Mr. W. M. K.	.. 40 ..	Chester	.. 2 ..	2 ..	.. Destitution.

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Total .. £34 0s. 8d.

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CREDIT.		£	s.	d.	DEBIT.		£	s.	d.
Officers' (Aldershot) Subscriptions for September	..	6	17	17	To Bandmaster's Salary and Band Pay for Quarter	..	2	9	84
Quarterly Grant, R.A.M.C. Fund	..	0	90	0	" Artists' Fees for Concert	..	6	18	8
Officers' (Aldershot) Subscription for October	..	6	7	7	" Fares, Outstanding Accounts and Petty Cash	..	4	0	12
Refund Aldershot Account (Petty Cash) ..	..	0	9	9	" Hawkes and Co. ..	..	7	1	9
November					" Master Tailor ..	..	3	9	9
By Subscription, Major Berryman	..	0	5	0	" Cost of 'Cello and Case Complete	..	0	10	4
" Balance Credit brought forward	..	3	14	12	" Bartlett and Co. ..	..	5	0	1
					" Stationery Account	..	0	15	1
					" Bank Charge ..	..	0	1	0
					" Balance Credit at Bank ..	..	2	12	1
							9	0	133

(Signed) E. W. W. COCHRANE, Major R.A.M.C., President.  
R. P. LEWIS, Captain R.A.M.C. } Members.  
A. F. C. MARTYN, Lieutenant R.A.M.C. }

[illegible]

WALLACE BENSON, Captain R.A.M.C.,  
Band President.

# ROYAL ARMY MEDICAL CORPS FUND.

## STATEMENT OF ACCOUNTS FOR 1913.

RECEIPTS.		£	s.	d.	EXPENDITURE.		£	s.	d.
Balance in hand, December 31, 1912—					Grants to Band	..	..	..	432 0 0
Current Account	..	£339	3 10		" Dinner	..	..	..	261 7 6
Deposit Account	..	2,200	0 0		" General Relief Fund	..	..	..	80 0 0
Subscriptions	..	..	..	2,539 3 10	Colonel Skinner expenses, Memorial	..	..	..	0 3 3
Interest on Deposit Accounts	..	..	..	1,116 9 6	Purchase of £1,011 Caledonian Railway 4 % No. 1 Con.	..	..	..	998 8 3
Royalties on sale of Service Memoirs	..	..	..	27 18 4	Preference Stock at 97½	..	..	..	1,001 3 9
Dividends:—				22 7 3	Purchase of £1,035 N. British Railway 4 % Preference Stock at 95½	..	..	..	10 10 0
£1,011 Caledonian Railway 4 % Preference Stock				35 6 6	Honorarium Editor Service Memoirs	..	..	..	11 17 3
£1,035 N. British Railway 4 % Preference Stock				35 14 8	General Relief Fund, Royalties on Service Memoirs	..	..	..	1 10 0
					Refund Subscriptions	..	..	..	1 5 10
					Expenses at Sister Mary Stanislaus' Funeral	..	..	..	25 0 0
					Royal School, Bath. Donation	..	..	..	26 5 0
					" " Subscription	..	..	..	4 4 0
					Memorial Insurance at Q.A.M.H. Chapel	..	..	..	0 16 6
					Bankers' Charges	..	..	..	1 1 0
					Shorthand writer	..	..	..	90 0 0
					Secretarial and Office Expenses	..	..	..	3 10 10
					Stationery and Printing	..	..	..	1 17 0
					Postage	..	..	..	..
					Balance in hand December 31, 1913:—				£25 19 11
					Current Account	..	..	..	800 0 0
					Deposit Account	..	..	..	825 19 11
									£3,777 0 1

## INVESTMENTS.

Caledonian Railway 4 % Preference Stock	..	£1,011	0 0
N. British Railway 4 % Preference Stock	..	1,035	0 0
		<u>£2,046</u>	<u>0 0</u>

# STATEMENT OF ACCOUNTS OF THE GENERAL RELIEF FUND FOR THE YEAR 1913.

RECEIPTS.		£	s.	d.	EXPENDITURE.		£	s.	d.
Balance in hand, December 31, 1912—					Grants to Tidworth Command	..	..	..	..
Current Account	..	£386	18	4	Aldershot	..	..	..	10 0 0
Deposit Account	..	..	400	0 0	Chester	..	..	..	34 8 0
					Dublin	..	..	..	7 0 0
Grants from R.A.M.C. Fund	..	..	786	18 4	Netley	..	..	..	4 0 0
" Companies and A.T.A., Aldershot	..	..	..	80 0 0	Cork	..	..	..	9 0 0
Subscriptions	..	..	..	309 18 11	Colchester	..	..	..	11 0 0
Refunds from Recipients	..	..	..	4 5 0	London	..	..	..	12 0 0
Mr. Kay, for child	..	..	..	2 0 0	Portsmouth	..	..	..	17 17 6
Interest on Deposit Account	..	..	..	8 13 0	Woolwich	..	..	..	10 0 0
Dividends—	..	..	..	10 0 8	Devonport	..	..	..	10 0 0
Canada $3\frac{1}{2}$ per cent Stock	..	..	..	19 19 6	Chatham	..	..	..	8 0 0
East India Railway $3\frac{1}{2}$ per cent Stock	..	..	..	16 9 8	Edinburgh	..	..	..	4 0 0
Malta, sent in error	..	..	..	10 0 0	Union Jack Club Subscription	..	..	..	25 4 0
Rebate of Income Tax	..	..	..	5 7 5	Corps of Commissioners Subscription	..	..	..	10 0 0
Royalties on Sale of Service Memoirs	..	..	..	11 17 3	Soldiers' and Sailors' Help Society Subscription	..	..	..	5 0 0
					National Association for Employment of R. and D. Soldiers Subscription	..	..	..	5 0 0
					Male Nurses A. and N. Co-op. Donation	..	..	..	5 0 0
					Malta Grant Refunded	..	..	..	5 0 0
					Expenses at Record Office	..	..	..	5 0 0
					Bankers' Charges	..	..	..	0 6 9
					Royal Soldiers' Daughters' Home	..	..	..	19 0 0
					Balance, December 31, 1913—	..	..	..	..
					Current Account	..	£639	13 6	..
					Deposit Account	..	400	0 0	..
							1,039	13 6	..
							£1,265	9 9	..

	£	s.	d.
General Relief Trust Investments—			
Canada $3\frac{1}{2}$ per cent Stock	..	609	6 9
East India Railway $3\frac{1}{2}$ per cent Stock	..	485	0 0
		£1,094	6 9

# STATEMENT OF COMPASSIONATE SCHOOL FUND ACCOUNTS.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Balance in hand December 31, 1912—				Royal Soldiers' Daughters' Home	..	..	82 1 0
Current Account	..	..	£110 16 0	Drummond Institute	..	..	5 0 0
Deposit Account	..	..	400 0 0	Home for Catholic Destitute Children..	..	..	12 0 0
Interest on Deposit Account	..	..	510 16 0	Balance, December 31, 1913—			
			11 9 9	Current Account	..	£123 4 9	
				Deposit Account	..	300 0 0	
							423 4 9
							£523 5 9

## BALANCE SHEET.

## STATEMENT OF ACCOUNTS.

ASSETS.	£	s.	d.
Balance per Pass Book,			
December 31, 1912 ..	£836	18	2
Receipts per Pass Book, 1913	3,233	2	6
Expenditure per Pass Book,			
1913 (deducted) ..	3,281	2	6
Balance in Bank, December 31, 1913 ..			788 18 2
Deposits R.A.M.C. Fund ..			800 0 0
General Relief Fund ..			400 0 0
School Fund ..			300 0 0
R.A.M.C. Fund Investments ..			2,046 0 0
General Relief Trust Investments ..			1,094 6 9
			<u>£5,429 4 11</u>

**Examined and found correct,**

(Signed) E. M. WILSON, *Lieut.-Colonel, R.P.*

O. R. A. JULIAN, *Lieut.-Colonel, R.A.M.C.*

124, Victoria Street, S.W.

**January 6, 1914.**

## ROYAL ARMY MEDICAL CORPS OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON  
MONDAY, JANUARY 19, 1914, AT 3.15 P.M.

### *Present.*

Surgeon-General Sir Launelotte Gubbins, K.C.B., M.V.O., K.H.S. (President), in the Chair.

Surgeon-General W. Babbie, V.C., C.B., C.M.G.

Surgeon-General W. Donovan, C.B.

Colonel J. Lane Notter.

Colonel B. Skinner, M.V.O.

Colonel E. H. L. Lynden-Bell.

Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

Lieutenant-Colonel A. B. Cottell.

Lieutenant-Colonel E. M. Pilcher, D.S.O.

Major E. T. F. Birrell.

Colonel W. Horrocks apologized for his absence.

(1) The Minutes of the last Meeting were read and confirmed.

(2) The Accounts for the year 1913 having been duly audited, were considered and passed. They are appended hereto.

(3) It was noted that the revised rules have been printed, and a copy sent through the courtesy of Administrative Medical Officers to each officer of the Corps.

(4) Lieutenant-Colonel F. W. H. Davie Harris was re-elected Secretary for a term of three years—until June, 1917.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*  
*Secretary.*

124, Victoria Street, S.W.

## ARMY MEDICAL OFFICERS' WIDOWS AND ORPHANS' FUND.

PROCEEDINGS OF A MEETING OF THE COMMITTEE HELD AT THE WAR OFFICE, ON  
MONDAY, JANUARY 19, 1914.

### *Present.*

Surgeon-General Sir Launelotte Gubbins, K.C.B., M.V.O., K.H.S., Director General, Army Medical Service, President, in the Chair.

Surgeon-General W. S. M. Price, Vice-President.

Deputy-Surgeon General W. G. Don, Vice-President.

Surgeon-General Sir Charles Cuffe, K.C.B.

Colonel W. H. Horrocks.

Colonel M. W. Russell.

Lieutenant-Colonel A. F. S. Clarke.

Major C. E. Pollock.

Letters were read from Colonel R. W. Ford, D.S.O., Colonel Sir William Leishman, F.R.S., and Lieutenant-Colonel T. W. Gibbard regretting their inability to attend.

(1) The minutes of the previous meeting were read and confirmed.

(2) It was resolved that the election of members of the Committee in the place of Colonel M. W. Russell and Major C. E. Pollock, proceeding abroad, stand over till the Annual General Meeting.

(3) The death, on November 14 last, of Mrs. Julia Prendergast, a first-class annuitant, was reported.

The resignation of Surgeon-Major-General H. F. Paterson, a widower member since 1912, was reported.

(4) Major W. S. Harrison and Captain R. G. S. Gregg were admitted as married members.

(5) A certificate was submitted from the Actuary that the marketable securities of the Society were trustee securities on December 31, 1913.

Payment of the Actuary's fee (£10 10s.) for the past year was sanctioned.



# ROYAL ARMY MEDICAL CORPS OFFICERS' BENEVOLENT SOCIETY.

## STATEMENT OF ACCOUNTS FOR 1913.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
To Balance in Bank, January 1, 1913	..	..	374 5 10	By Grants	..	..	725 0 0
" Subscriptions	..	..	188 4 6	" Auditors' Fee	..	..	1 1 0
" Dividends—				" Bankers' Charges	..	..	0 5 6
North Eastern Railway, 3 % Debenture Stock	..	..	188 6 2	" Secretarial and Office Expenses	..	..	90 0 0
London & North Western Railway, 3 % Debenture Stock (less tax £11 13s. 4d.)	..	..	188 6 10	" Stationery	..	..	2 10 0
Midland Railway, 2½ % Debenture Stock (less tax £9 6s. 8d.)	..	..	150 13 4	" Printing " Corps News "	..	..	1 0 10
Caledonian Railway, 4 % Debenture Stock (less tax £6 9s. 8d.)	..	..	104 14 4	" Postage	..	..	1 17 0
On £1,177 7s. 9d. Consols	..	..	27 14 4	" Straker, Ltd.	..	..	7 0 5
Rebate of Income Tax	..	..	61 6 0	" Refund of Subscriptions	..	..	1 1 0
				" Fees for verification of Consols	..	..	0 2 0
				" Balance in Bank, December 31, 1913	..	..	453 13 7
			<u>£1,283 11 4</u>				<u>£1,283 11 4</u>

### INVESTMENTS.

	£	s.	d.
London & North Western Railway, 3 % Debenture Stock	6,667	0	0
North Eastern Railway, 3 % Debenture Stock	..	6,666	0 0
Midland Railway, 2½ % Debenture Stock	..	6,400	0 0
Caledonian Railway, 4 % Debenture Stock	..	2,780	0 0
Consols	..	1,177	7 9
	<u>£23,690</u>	<u>7</u>	<u>9</u>

*Inspected January 6, 1914.*

We have compared the above statement with the books and papers relating thereto, and certify that it is correct. We have verified the Bank Balance and the Investment in Consols, and have inspected the Certificate of the Investments in Railway Stocks as set out.

January 8, 1914.

(Signed) EVANS, PIERSON & CO.  
*Chartered Accountants.*



(6) An application from the widow of a former member of the Society was considered, but the Committee regretted that nothing could be done in the matter.

(7) The Secretary having raised the question of the payment of subscriptions by members at half-yearly or quarterly intervals was directed to bring the matter up at the next meeting.

(8) Payment of the Secretary's salary and office allowance for the past quarter was sanctioned, as was the refund to him of petty cash expended.

(9) The question of the appointment of a Secretary having been considered, the following resolution was proposed by Deputy-Surgeon-General Don, seconded by Surgeon-General Price and carried unanimously: "That Captain J. T. Clapham be re-elected Secretary of the Society for a further period of five years from April next, at the same salary and allowance as at present, and that his nomination be submitted to the next Annual General Meeting for confirmation, in accordance with Rule XXI."

(10) The meeting closed with a vote of thanks to the Chair.

J. T. CLAPHAM, *Captain,*  
*Secretary.*

20, Belgrave Road, S.W.

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## ROYAL ARMY MEDICAL CORPS CENTRAL MESS AND GAMES COMMITTEE.

THE next meeting of this Committee will be held at the Royal Army Medical College on Monday, February 9, at 2.30.

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### NOTES ON GAMES AND SPORT.

*Association Football.*—Serjeant-Major C. Drury, R.A.M.C., writes from Aldershot:—

"The following matches have been played since the last report in the Journal: on January 3 the Portsmouth Amateurs met our team in the 1st round of the Amateur Cup on the Army Football Ground, which was won by the Corps by 4 goals to 1. On 17th inst. we played the 2nd round Amateur Cup, and were again successful, beating the 1st Battalion King's Royal Rifles, 2 goals to none.

"Both of these matches were played under the new conditions, i.e., the soldier pays gate money on the Army Football Ground.

"This rule has been a decided success; by means of turnstiles the exact number who paid for admission at our last match was 3,133 (civilians being admitted through a different entrance), although four other military matches were played at the same time in Aldershot.

"The Boys have played two friendly matches and have added another 17 goals to their total. They met the Aldershot Shop Assistants on the 7th, winning by 8 goals to none, and on the 14th beat the Pupil Teachers of the Garrison Schools, 9 goals to nothing."

"*Golf.*—The Army Golf Meeting will be held this year in Scotland, during October. There will be a spring meeting at Woking, of which further notice will be given when details are received."

For purposes of entry for the Inter-regimental Challenge Cup (by teams of four) the division of the Royal Army Medical Corps into the following units has been approved by the Army Golf Committee:—

(1) Aldershot Command. (2) Headquarters' Staff at War Office; London District; R.A.M. College. (3) Eastern Command Staff; Woolwich and Colchester Districts. (4) Dover and Chatham Districts. (5) Southern Command Staff; Salisbury Plain and Plymouth Districts. (6) Portsmouth District; Netley; Channel Isles. (7) Western Command. (8) Northern Command. (9) Scottish Command. (10) Irish Command Staff and Dublin District. (11) Cork and Belfast Districts. (12) Captain's Class, R.A.M. College.

3, Homefield Road,  
Wimbledon Common, S.W.

J. T. CLAPHAM, *Captain,*  
*Hon. Sec.*

## WARRANT OFFICERS AND SERJEANTS, PRESENT AND PAST, ANNUAL DINNER CLUB.

### PRELIMINARY NOTICE *re* SIXTH ANNUAL DINNER.

THE Committee have much pleasure in notifying to all concerned that arrangements have been made to hold the sixth Annual Dinner at Anderton's Hotel, Fleet Street, on Wednesday, April 15 next, 6.30 for 7.30. Tickets 3s. 6d. each.

The Director-General has consented to preside on that night, and the Band of the Corps has been engaged.

It is hoped to make the dinner a great success, and to do so the hearty co-operation of all members is most necessary. Several subscriptions due March 31, 1914, are outstanding; the Hon. Sec. will be pleased to acknowledge the receipt of same.

Further particulars and usual notices will be issued later to all concerned.

R.H.H.,

January 14, 1914.

FRED G. COURT, *Staff Serjeant*,

*Hon. Sec.*

## OLD COMRADES' LADYSMITH SIEGE DINNER 1914.

WE have been asked to publish the following notice:—

"77, MELROSE AVENUE,

"WIMBLEDON PARK, S.W.

"The Second Annual Dinner will be held at the Headquarters of the Queen Victoria's Rifles, Davies Street, Berkeley Square, W., on Saturday, March 14, 1914. Doors open at 6.30; dinner at 7 p.m.; dress optional with medals.

"Defenders intending to dine should send notice together with remittance to the Hon. Secretary at the above address. The price of the dinner will be 3s.

"The Committee wish to bring to the notice of their comrades that the price fixed is actually insufficient to cover normal expenses, and to meet the excess cost they propose to create a small dinner fund, based upon voluntary contributions of, say, sixpence and upwards, as an alternative to increasing the price. The objection to the latter course is that many of our comrades are faced with heavy travelling expenses in addition to the cost of the dinner and any increase would, it is feared, tend to produce an unwelcome effect on the attendance. It has been ascertained that similar associations not supported from regimental funds, find that the revenue derived from such contributions (which are intended to be of a *purely voluntary character*) is sufficient to attain the end in view, and the Committee feel confident that they will be assisted in this matter in the same splendid spirit of comradeship and unity of purpose, which went so far towards making our inaugural function such a marked success last year.

"J. BAKER,

*"Hon. Secretary."*

## UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Thursday, February 12, 1914, at 5 p.m. Subject: "The Siege of Ladysmith," Colonel S. Westcott, C.M.G., A.M.S.

## OBITUARY.

### MAJOR ERNEST CHESTER ANDERSON, D.S.O.

MAJOR E. C. ANDERSON died at Golden Hill Fort, Isle of Wight, on December 22, 1913, aged 50. He was educated at St. Mary's Hospital and became a member of the Royal College of Surgeons in 1887, and a Licentiate of the Royal College of Physicians in 1889. He entered the service as a Surgeon-Lieutenant on January 30, 1892, and his first foreign service was in India. He was promoted Surgeon-Captain on

January 30, 1895. He proceeded to South Africa in 1899 and served during the South African War. He was present at the Relief of Kimberley; the operations in the Orange Free State, including the operations at Paardeberg; and actions at Poplar Grove and Dreifontein. He was mentioned in despatches and received the Queen's medal with four clasps and the King's medal with two clasps. He was also made a Companion of the Distinguished Service Order. He returned home in 1903 and was promoted Major, Royal Army Medical Corps, on January 30, 1904. In December, 1908, he proceeded to India for a second term of service. On January 30, 1912, he was placed on retired pay, and shortly afterwards assumed charge of Golden Hill Fort, where he remained until his death in 1913.

**QUARTERMASTER AND HONORARY CAPTAIN GEORGE FRANCIS SHORT,  
ROYAL ARMY MEDICAL CORPS.**

CAPTAIN G. F. SHORT died on January 21, 1914, aged 51. He enlisted in the Army Hospital Corps on April 5, 1880, and received Her Majesty Commission as Quartermaster and Honorary Lieutenant on December 6, 1899; he was promoted Captain, December 6, 1909.

Captain Short was an excellent Chinese scholar, and achieved much success in romanizing six books in that language. He was also a good musician and a keen sportsman.

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## BIRTHS.

DUNKERTON.—At 29, Kenilworth Court, Putney, S.W., on December 27, 1913, the wife of Captain N. E. Dunkerton, R.A.M.C., of a son.

ELSNER.—On December 31, 1913, at 190, Pine Street, Pietermaritzburg, Natal, to Major and Mrs. O. W. A. Elsner, R.A.M.C., a daughter.

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## DEATHS.

BRADLEY.—On December 6, at 3, Napier Road, Allahabad, India, Esther Ellen Lacey, the darling wife of Captain F. H. Bradley, R.A.M.C.

ANDERSON.—On December 22, at Golden Hill Fort, Isle of Wight, Major E. C. Anderson, D.S.O., R.A.M.C.

CRAWFORD.—On January 6, 1914, at sea on board S.S. Soudan, Ethel Mercy, the beloved wife of Major V. J. Crawford, R.A.M.C.

SHORT.—On January 21, at the Royal Victoria Hospital, Netley, Quartermaster and Honorary Captain G. F. Short, R.A.M.C., aged 51.

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## EXCHANGES, &c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates:—

NUMBER OF REPRINTS	NUMBER OF PAGES	COST OF REPRINTS	COST OF EXCERPTS *	EXTRA FOR COVERS FOR REPRINTS			
				As Journal, Printed on Front	As Journal, Plain, Unprinted	Cheaper Paper, Printed on Front	Cheaper Paper, Plain, Unprinted
		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

\* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that may happen to appear on the first and last pages of the particular excerpt ordered.

**CASES FOR BINDING VOLUMES.**—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.

These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

*All Applications for Advertisements to be made to—*

G. STREET & CO., LTD., 8, SERLE STREET, LONDON, W.C.

The back outside cover is not available for advertisements.

## Notices.

### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

**All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.**

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S. W.

Communications have been received from Captain W. E. C. Lunn, Major E. T. Gunter, Colonel F. Smith, Colonel C. Birt, Major W. B. Fry, Major J. V. Forrest, Major C. R. L. Ronayne, Colonel R. H. Firth, Major A. W. Hooper, Major H. A. L. Howell, Captain P. G. Easton, Captain C. R. Sylvester Bradley, Major S. H. Fairrie, Major P. H. Falkner, Major E. M. Morpew, Captain K. Comyn, Mr. J. Hartley Durrant, Lieutenant-Colonel W. A. Morris, Major E. Ryan, Major C. T. K. Maurice.

The following publications have been received :—

*British :* The British Journal of Tuberculosis, The Indian Medical Journal, Journal of the Royal United Service Institution, The Hospital, Transactions of the Society of Tropical Medicine and Hygiene, Medical Press and Circular, The Lancet, The Army Service Corps Journal, Army and Navy Gazette, Tropical Diseases Bulletin, The Australasian Medical Gazette, Guy's Hospital Gazette, The St. Thomas's Hospital Gazette, The Journal of Tropical Medicine and Hygiene, The Medical Review, The Medical Journal of South Africa, The Middlesex Hospital Journal, Tropical Veterinary Bulletin, The Shield, Memoirs of the Department of Agriculture in India, The Indian Medical Gazette, The Royal Engineers' Journal, Bulletin of Entomological Research, The Practitioner, Bedrock, Annals of Tropical Medicine and Parasitology, The Indian Journal of Medical Research, The Army Service Corps Quarterly, St. Bartholomew's Hospital Journal, Public Health, Red Cross and Ambulance News, The Quarterly Journal of Medicine, Proceedings of the Royal Society of Medicine, The Journal of State Medicine, The Cavalry Journal.

*Foreign :* Deutsche Militärärztliche Zeitschrift, Office International d'Hygiène Publique, The Military Surgeon, American Medicine, Bulletin de l'Institut Pasteur, Revista de Sanidad Militar, Annali de Medicina Navale e Coloniale, Archiv für Schiffs-und Tropen-Hygiene, Norsk Tidsskrift for Militærmedicin, Le Caducée, Giornale di Medicina Militare, Boletim da Sociedade Brasileira de Dermatologia, Schmidt's Jahrbücher, Bulletin de la Société de Pathologie Exotique, Bulletin of the Johns Hopkins Hospital, Russian Naval Medical Journal, Archives de Médecine et de Pharmacie Militaires.

## MANAGER'S NOTICES.

The **JOURNAL OF THE ROYAL ARMY MEDICAL CORPS** is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,  
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"  
WAR OFFICE, WHITEHALL, S.W.



# JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

## Corps News.

MARCH, 1914.

### ESTABLISHMENTS.

Royal Army Medical College: Major Stevenson L. Cummins, M.B., Royal Army Medical Corps, an Assistant Professor, to be a Professor, *vice* Brevet-Colonel Sir W. B. Leishman, Knt., M.B., F.R.S., Royal Army Medical Corps, Honorary Physician to the King, dated February 1, 1914. Captain A. C. H. Gray, M.B., Royal Army Medical Corps, to be an Assistant Professor, *vice* Major S. L. Cummins, M.B., dated February 1, 1914.

### ROYAL ARMY MEDICAL CORPS.

The undermentioned are restored to the establishment: Supernumerary Lieutenant-Colonel Hugh C. Thurston, C.M.G., *vice* A. R. Aldridge, retired, dated January 24, 1914; Supernumerary Lieutenant-Colonel and Brevet-Colonel Sir William B. Leishman, Knt., F.R.S., M.B., K.H.P., dated February 1, 1914.

Lieutenant-Colonel Monckton O'D. Braddell, M.B., retires on retired pay, dated February 4, 1914.

Lieutenant-Colonel William Turner is placed on retired pay, dated February 25, 1914.

The undermentioned Majors to be Lieutenant-Colonels: Henry Dunn, M.B., *vice* M. O'D. Braddell, M.B., retired, dated February 4, 1914; Samuel H. Withers, M.B., *vice* W. Turner, retired, dated February 25, 1914.

Major John D. G. Macpherson, M.B., to be Deputy Assistant Director of Medical Services of a Territorial Division, dated January 29, 1914.

Major Charles E. P. Fowler retires on retired pay, dated February 4, 1914.

Major Frederick A. Stephens is placed temporarily on the half-pay list, on account of ill-health, dated February 4, 1914.

Captain Barry A. Craig to be Major, dated January 29, 1914.

Supernumerary Captain Malcolm Leckie is restored to the establishment, dated February 11, 1914.

Captain Archer Irvine-Fortescue, M.B., is seconded whilst studying the Japanese language, dated December 21, 1913.

Captain Benjamin A. Odlum is seconded for service under the Colonial Office, dated January 1, 1914.

The undermentioned Lieutenants to be Captains, dated January 29, 1914: Charles H. Harold, M.D., Eric L. Ffyyffe, M.B., Robert F. Bridges, M.B., Thomas J. Hallinan, M.B., Hugh G. Monteith, John D. Bowie, M.B., Charles H. Stringer, Guy O. Chambers, John K. Gaunt, M.B., Leslie F. K. Way.

Lieutenant Francis J. Cairns, M.B., resigns his commission, dated February 7, 1914.

Supernumerary Lieutenant George E. Dyas is restored to the establishment, dated January 24, 1914.

The undermentioned Lieutenants are confirmed in their rank: Sumner H. Smith, Robert B. Price, M.B., William V. Corbett, Frank C. Cowtan, Noel T. Whitehead, Henry C. D. Rankin, M.B.

The undermentioned to be Lieutenants (on probation) dated January 30, 1914: Lieutenant Treffry Owen Thompson, M.B., from the Royal Army Medical Corps Special Reserve; Stanley James Linzell, M.B., Lewis Rudall Shore, John Galbraith Gill, M.B., John William Cotter Stubbs, M.B., Sidney Martin Hattersley, M.B., David Wylie Rintoul, M.B., Allan Watson, M.B., Lieutenant Norman Veitch Lothian,

M.B., from the Royal Army Medical Corps Special Reserve; Thomas Francis Pennefather Breen, M.B., Lieutenant John FitzGerald Gwynne, M.B., from the 3rd West Riding Field Ambulance, Royal Army Medical Corps (T.F.), Arthur John Alexander Menzies, M.B.

The undermentioned Lieutenants are seconded under the provisions of Article 343, Royal Warrant for Pay and Promotion, 1913: Bernard Woodhouse, dated January 1, 1914, Treffry O. Thompson, M.B., Stanley J. Linzell, M.B., Lewis R. Shore, dated January 30, 1914.

Quartermaster and Honorary Major Timothy Francis Brake is placed on retired pay, dated February 18, 1914.

Quartermaster and Honorary Captain Joseph Attwood retires on retired pay, dated February 18, 1914.

The undermentioned Serjeant-Majors to be Quartermasters with the honorary rank of Lieutenant:—

Llewellyn Jones, dated February 7, 1914.

James Woollard and Edward Ernest Ward, dated February 18, 1914.

**HIGHER RATE OF PAY.**—Lieutenant-Colonels D. M. O'Callaghan, J. Donaldson, G. H. Barefoot, and F. R. Newland have been selected for the increased pay under Article 358, Royal Warrant for Pay and Promotion.

**ARRIVALS HOME FOR DUTY.**—From West Africa: as on January 24, Captain J. Fairbairn. From India: on January 30, Lieutenant-Colonel M. P. C. Holt, D.S.O., Majors W. R. Blackwell, J. Matthews and A. H. Safford. Captain E. B. Lathbury; on February 5, Lieutenant-Colonel F. J. Morgan, Major E. W. Bliss, Captains R. D. O'Connor and F. Casement. From Malta: on February 19, Major W. L. Baker, Captains P. S. Stewart and W. K. Beaman.

**ARRIVALS HOME ON LEAVE.**—Captains W. F. H. Vaughan, T. C. Lucas, F. H. M. Chapman, G. F. Dawson, F. J. Stuart, R. M. Dickson, F. H. Bradley, J. B. Jones, J. J. D. Roche, and J. K. Gaunt.

**POSTINGS.**—Royal Arsenal, Woolwich: Lieutenant-Colonel F. J. Morgan. Scottish Command: Captain F. Casement. Northern Command: Major J. Matthews, Captains W. K. Beaman and R. D. O'Connor. Aldershot Command: Lieutenant-Colonel M. P. C. Holt, D.S.O. Eastern Command: Majors E. W. Bliss and W. L. Baker. Irish Command: Major A. H. Safford, Captains E. B. Lathbury and J. A. Bennett. Southern Command: Captain P. S. Stewart. London District: Major W. R. Blackwell.

Major H. G. Pinches and Lieutenant N. T. Whitehead have been posted to the Eastern Command instead of to the Irish Command and London District respectively, as previously notified.

**TRANSFERS.**—To Canterbury: Lieutenant-Colonel T. B. Winter, from Colchester. To Dover: Lieutenant-Colonel D. M. O'Callaghan, from Hilsea. To Colchester: Lieutenant-Colonel F. R. Newland, from Dover; Captain N. Low, from Portsmouth.

**TRANSFERS TO THE HOME ESTABLISHMENT.**—From India, on January 21, Captain F. T. Turner.

**APPOINTMENTS.**—Lieutenant-Colonel T. B. Winter, charge of the Military Hospital, Canterbury. Lieutenant-Colonel D. M. O'Callaghan, charge of the Military Hospital, Dover, and Senior Medical Officer, South-Eastern Coast Defences. Lieutenant-Colonel F. R. Newland, charge of the Military Hospital, Colchester. Lieutenant-Colonel F. J. Morgan, Senior Medical Officer, Royal Arsenal, Woolwich. Lieutenant-Colonel M. P. C. Holt, D.S.O., charge of the Surgical Wards, Cambridge Hospital, Aldershot. Major E. Brodribb, Specialist in Ophthalmology, Malta. Captain N. Low, Sanitary Officer, Eastern Command.

**RETIRED PAY APPOINTMENT.**—Lieutenant-Colonel J. Kearney, Medical Charge at Landguard Fort (transferred from Wrexham).

The following retired pay appointments are vacant: Fort Efford and Mutley District, Golden Hill, Netheravon, Trowbridge, and Wrexham.

**QUALIFICATIONS.**—The undermentioned officers have obtained the degrees, &c., noted against their names: Captain N. Low, the Diploma in Public Health of the Royal Colleges of Physicians, London, and Surgeons, England; Captain W. E. Marshall, the Diploma in Public Health of the University of St. Andrews; Lieutenant J. L. Ritchie, the Fellowship of the Royal College of Surgeons, England.

**ROSTER FOR SERVICE ABROAD.**—Majors J. G. McNaught and E. F. Q. L'Estrange, Captains H. Stewart and J. B. Grogan, have exchanged to higher

positions on the roster with Majors T. P. Jones and G. A. Moore, Captains W. F. Tyndale, C.M.G., and R. H. Bridges, respectively.

**EMBARKATIONS.**—For West Africa: on February 3, Major C. E. Pollock, Captains E. B. Booth, G. Ormrod and M. J. Cromie. For India: on February 11, Colonel C. Birt. Lieutenant-Colonels J. F. Donegan and R. Holyoake, Captains B. G. Patch, H. C. Winckworth and C. E. W. S. Fawcett, Lieutenant W. W. Pratt. For Malta: on February 14, Lieutenant R. C. Carlyle.

**CHANGE OF NAME.**—Major F. W. Lambelle has, by Deed Poll dated January 7, changed his surname to Lamballe.

**RESULTS OF EXAMINATIONS.**—The following results of examinations are notified for general information:—

Passed for the rank of Lieutenant-Colonel:—

In Appendix xiv, K.R., Part 1: Majors S. A. Archer, M. MacG. Rattray, R. S. H. Fuhr, D.S.O., G. H. Goddard and J. W. Leake.

In Appendix xiv, K.R., Part 1, Subject 1: Majors H. A. L. Howell and A. W. Hooper, D.S.O.

Passed for promotion to the rank of Major:—

In Appendix xi, K.R., Subhead (b): Captain W. K. Beaman.

In Appendix xi, K.R., Subhead (c) ii: Captains O. R. McEwen and G. Petit.

In Appendix xi, K.R., Subheads (d) ii and (d) iii: Majors G. T. K. Maurice, H. S. Taylor, F. G. Richards, F. McLennan and H. R. Bateman, Captains A. C. Osburn, F. J. Garland, H. C. Sidgwick, H. St. M. Carter, L. V. Thurston, H. G. Sherren, J. H. Graham, H. Stewart and A. M. Pollard.

In Appendix xi, K.R., Subhead (d) ii: Majors M. Boyle, T. C. Lauder and L. Cotterill, Captains S. C. Bowle and E. B. Booth.

In Appendix xi, K.R., Subhead (d) iii: Majors H. A. L. Howell, G. B. Riddick, E. A. Bourke, P. H. Collingwood, A. L. A. Webb, B. B. Burke, E. W. Powell, W. M. Power, J. B. Clarke, E. Ryan and J. H. R. Winder, Captains J. W. S. Seccombe, H. T. Wilson, J. S. Pascoe, G. Ormrod, E. T. Potts, W. McConaghy and C. Kelly.

Passed for promotion to the rank of Captain:—

In Appendix xi, K.R., Subhead (c) ii: Lieutenant T. A. Weston.

In Appendix xi, K.R., Subheads (d) ii, (d) iii and (d) iv: Lieutenants A. G. Biggam, D. T. M. Large, M. Burnett, A. Hood, W. B. Stevenson, G. A. Blake, R. W. Vint, E. C. Lang, L. T. Poole, T. H. Balfour, N. W. Stevens and J. C. Sproule.

In Appendix xi, K.R., Subheads (d) ii and (d) iii: Lieutenant H. F. Pantan.

LIST OF SUCCESSFUL CANDIDATES FOR COMMISSIONS IN THE ROYAL ARMY MEDICAL CORPS AT THE COMPETITION HELD IN LONDON IN JANUARY, 1914, FOR WHICH FORTY-TWO CANDIDATES ENTERED.

Names	Medical School	Qualifications	Marks
*Thompson, T. O.	Oxford Univ. and St. George's Hospital	B.A., M.B., B.Ch. Univ. Oxford	601·5
Linzell, S. J. ..	Edinburgh University ..	M.B., Ch.B. Univ. Edin. ..	584·5
*Shore, S. R. ..	Cambridge Univ. and St. Bartholomew's Hosp.	B.A. Cantab., M.R.C.S. Eng., L.R.C.P. Lond.	580
*Gill, J. G. ..	Edinburgh University ..	M.B., Ch.B. Univ. Edin. ..	565·5
*Stubbs, J. W. C.	Trinity College, Dublin	B.A., M.B., B.Ch., B.A.O. Univ. Dublin	557·5
*Hattersley, S. M.	Cambridge Univ. and St. Bartholomew's Hosp.	B.A., M.B. Cantab., M.R.C.S. Eng., L.R.C.P. Lond.	556
*Rintoul, D. W.	St. Andrews University	M.B., B.S. St. And. .. ..	552
Watson, A. ..	Edinburgh University ..	M.B., Ch.B., D.P.H., D.T.M. Univ. Edin.	547·5
*Lothian, N. V.	Glasgow University ..	B.Sc., M.B., B.Ch. Univ. Glas.	545
*Breen, T. F. P.	Trinity College, Dublin	B.A., M.B., B.Ch., B.A.O. Univ., Dublin	540·5
Gwynne, J. F. G.	Sheffield University ..	M.B., Ch.B. Univ. Sheffield ..	533
Menzies, A. J. A.	Edinburgh University ..	M.A., M.B., Ch.B. Univ. Edin.	529

\* Awarded Service marks under paragraph 71 of the Regulations for the Officers' Training Corps.

**WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.****PROMOTIONS.**

The following promotions, to complete Establishment, will take effect from the dates specified :—

*To be Serjeant-Majors.*

No.	Rank and Name	Date	Section	Remarks
11141	Qmr.-Serjt. Coggon, T. E. . .	12.11.13	..	Vice J. T. Packard, to H.M. Commission.
11123	„ Polhill, H. J. . .	7.2.14	..	„ L. Jones, to H.M. Commission.

*To be Quartermaster-Serjeants.*

10542	Staff-Serjt. Mendel, A. E. . .	19.10.13	..	Vice W. H. Way, to Territorial Force.
11562	„ „ Ryan, J. . .	12.11.13	..	„ T. E. Coggon, promoted.
14461	„ „ Baker, A. . .	9.12.13	..	„ H. Williams, to pension.
12932	„ „ Gordon, C. . .	16.12.13	..	„ C. W. Hook, to pension.
13856	„ „ McKay, R. J. . .	28.12.13	..	„ O. Perry, to pension.
16115	„ „ Dewberry, E. B. .	31.12.13	..	„ H. G. Miller, to pension.

*To be Staff-Serjeants.*

17849	Serjeant „ Blanks, C. C. . .	2.10.13	..	Vice F. Loveland, to Territorial Force.
10540	„ „ Bottomley, G. . .	19.10.13	..	„ A. E. Mendel, promoted.
11318	„ „ Dewar, H. F. . .	19.10.13	..	„ G. Bottomley, supernumerary.
11816	„ „ Shepherd, L. A. .	22.10.13	..	„ A. Dearsley, to pension.
12025	„ „ Harrold, A. E. .	22.10.13	..	„ L. A. Shepherd, supernumerary.
10518	Staff-Serjt. Brice, E. . .	12.11.13	..	From Territorial Force, vice J. Ryan, promoted.
12890	Serjeant „ Gardiner, J. S. .	29.11.13	..	Vice A. E. Shaw, to pension.
10598	„ „ Knightley, P. G. .	9.12.13	..	„ A. Baker, promoted.
11211	„ „ Marsden, L. T. .	16.12.13	..	„ C. Gordon, promoted.
18912	„ „ Dawson, H. . .	28.12.13	..	„ R. J. McKay, promoted.
12815	„ „ Burgess, G. . .	31.12.13	..	„ E. B. Dewberry, promoted.

*To be Serjeants.*

No.	Rank and Name		Date	Section	Remarks
11392	Lce.-Serjt.	Conner, E. ..	2.10.13	Nursing ..	Vice C. C. Blanks, promoted.
1831	„ ..	Riley, S. T. ..	5.10.13	General Duty	„ G. T. Holmes, to pension.
16481	„ ..	Bee, W. W. ..	19.10.13	Nursing ..	„ H. F. Dewar, promoted.
17091	„ ..	Moore, J. ..	22.10.13	„ ..	„ A. E. Harrold, promoted.
18917	„ ..	Chadwick, H...	29.10.13	„ ..	„ H. G. Parsons, to Territorial Force.
11788	Serjeant ..	Macdonald, D.	22.11.13	General Duty	From Territorial Force, vice P. Bul-lough, to Colonial Government.
19320	Lce.-Serjt.	Ritchie, H. A.	22.11.13	Nursing ..	Vice H. B. Mason, to Colonial Government.
12428	„ ..	Ferguson, F. J.	22.11.13	„ ..	„ P. Harvey, to Colonial Government.
10191	„ ..	Moore, G. R. ..	22.11.13	Cooking ..	„ H. Kimberley, to Colonial Government.
17454	„ ..	Allport, E. C...	22.11.13	Nursing ..	„ H. Baker, to Colonial Government.
17058	„ ..	Fayter, H. ..	28.11.13	General Duty	„ T. Kearns, to pension.
11814	„ ..	Herington, A. E.	29.11.13	„ „	„ J. S. Gardiner, promoted.
14693	„ ..	Kay, F. W. ..	7.12.13	Cooking ..	„ J. Robinson, to pension.
17390	„ ..	Cowx, R. ..	9.12.13	General Duty	„ P. G. Knightley, promoted.
10887	„ ..	Humphrey, W.A.	16.12.13	Cooking ..	„ L. T. Marsden, promoted.
17513	„ ..	Gallivan, J. ..	28.12.13	Nursing ..	„ H. Dawson, pro-moted.
15804	„ ..	Fitze, J. ..	31.12.13	Cooking ..	„ G. Burgess, pro-moted.

*To be Corporals.*

No.	Rank and Name		Date	Section	Remarks
19060	Lce.-Corpl.	Kay, C. L. ..	2.10.13	Cooking ..	Vice F. Becker, appointed Lance-Serjeant.
19254	„ ..	Scales, G. A. ..	5.10.13	General Duty	„ B. B. Bevan, appointed Lance-Serjeant.
19433	„ ..	Blake, H. ..	7.10.13	Nursing ..	„ G. A. Davies, discharged.
19419	„ ..	Clark, W. G. W.	10.10.13	„ ..	„ F. Miller, to pension.
19427	„ ..	Vidler, C. E. ..	19.10.13	„ ..	„ W.A.Beckett, appointed Lance-Serjeant.
19460	„ ..	Payne, C. J. T.	22.10.13	„ ..	„ E. Cragg, appointed Lance-Serjeant.
19454	„ ..	Renshaw, E. S.	25.10.13	Clerical ..	„ H. Borland, to pension.
19453	„ ..	Wingate, A. C.	29.10.13	Q.A.I.M.N.S.	„ W. Bowler, appointed Lance-Serjeant.
19468	„ ..	Jack, G. D. ..	2.11.13	Clerical ..	„ C. Lomas, to Army Reserve.
19469	„ ..	Purnell, H. D.	5.11.13	Nursing ..	„ W. Webster, to pension.
19496	„ ..	Pettit, H. ..	22.11.13	General Duty	„ F. Harman, appointed Lance-Serjeant.
19497	„ ..	Jackson, J. K.	22.11.13	Nursing ..	„ T. P. Dent, appointed Lance-Serjeant.
19517	„ ..	Harrison, R. G.	22.11.13	Cooking ..	„ N. Moore, appointed Lance-Serjeant.
19515	„ ..	Salter, G. D. ..	22.11.13	„ ..	„ D. Davis, appointed Lance-Serjeant.
24	„ ..	Haynes, P. H.	28.11.13	Clerical ..	„ V. Tripp, appointed Lance-Serjeant.
19913	„ ..	Roberts, T. S.	29.11.13	„ ..	„ F. Poole, appointed Lance-Serjeant.
19553	„ ..	Flight, P. H. ..	7.12.13	Nursing ..	„ C. E. Bull, appointed Lance-Serjeant.
19432	„ ..	Parker, W. T. ..	9.12.13	„ ..	„ A. R. Robinson, appointed Lance-Serjeant.
19536	„ ..	Reece, W. E. ..	12.12.13	„ ..	„ H. Cunningham, discharged.
19539	„ ..	Sayers, G. E. ..	16.12.13	Cooking ..	„ W.C.Savegar, appointed Lance-Serjeant.
19401	„ ..	Harland, A. E.	22.12.13	General Duty	„ T. Moody, reduced.
19574	„ ..	Howe, T. ..	28.12.13	„ ..	„ G. Ireland, appointed Lance-Serjeant.
19581	„ ..	Cannon, H. J.	29.12.13	Cooking ..	„ C. Hughes, to pension.
19823	„ ..	Kilyon, T. J. ..	31.12.13	Nursing ..	„ D. Blair, appointed Lance-Serjeant.



## APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified : —

*To be Lance-Serjeants.*

No.	Rank and Name		Date	Section	Remarks
10611	Corporal ..	Becker, F. ..	2.10.13	Clerical ..	Vice E. Conner, promoted.
18332	„ ..	Bevan, B. B. ..	5.10.13	Cooking ..	„ S. T. Riley, promoted.
17794	„ ..	Beckett, W. A.	19.10.13	Q.A.I.M.N.S.	„ W. W. Bee, promoted.
17870	„ ..	Cragg, E. ..	22.10.13	General Duty	„ J. Moore, promoted.
17964	„ ..	Bowler, W. ..	29.10.13	Nursing ..	„ H. Chadwick, promoted.
17834	„ ..	Harman, F. ..	22.11.13	General Duty	„ H. A. Ritchie, promoted.
15683	„ ..	Dent, T. P. ..	22.11.13	„ „	„ F. J. Ferguson, promoted.
17825	„ ..	Moore, N. ..	22.11.13	Nursing ..	„ G. R. Moore, promoted.
17977	„ ..	Davis, D. ..	22.11.13	Cooking ..	„ E. C. Allport, promoted.
18657	„ ..	Tripp, V. ..	28.11.13	Clerical ..	„ H. Fayter, promoted.
19192	„ ..	Poole, F. ..	29.11.13	Nursing ..	„ A. E. Herington, promoted.
19595	„ ..	Bull, C. E. ..	7.12.13	Clerical ..	„ F. W. Kay, promoted.
17714	„ ..	Robinson, A. R.	9.12.13	Q.A.I.M.N.S.	„ R. Cowx, promoted.
19933	„ ..	Savegar, W. C.	16.12.13	Nursing ..	„ W. A. Humphrey, promoted.
16949	„ ..	Ireland, G. ..	28.12.13	Cooking ..	„ J. Gallivan, promoted.
17001	„ ..	Blair, D. ..	31.12.13	General Duty	„ J. Fitze, promoted.

*To be Lance-Corporals.*

No.	Rank and Name		Date	Section	Remarks
5582	Private	.. Fielder, A. G...	2.10.13	General Duty	Vice C. L. Kay, promoted.
88	..	.. Robinson, S. ..	4.10.13	.. ..	.. C. M. Ames, to Army Reserve.
94	..	.. Price, D. W. ..	5.10.13	Nursing ..	.. G. A. Scales, promoted.
95	..	.. Thomas, A. G. W.	7.10.13	.. ..	.. H. Blake, promoted.
109	..	.. Emmment, A. G.	10.10.13	Cooking ..	.. W. G. W. Clark, promoted.
113	..	.. Powell, J. D. ..	19.10.13	Nursing ..	.. C. E. Vidler, promoted.
118	..	.. Rogers, A. C ..	22.10.13	.. ..	.. C. J. T. Payne, promoted.
91	..	.. Bates, R. ..	25.10.13	Cooking ..	.. E. S. Reushaw, promoted.
132	..	.. Dart, S. ..	29.10.13	.. ..	.. A. C. Wingate, promoted.
153	..	.. Richardson, G. T.	2.11.13	General Duty	.. G. D. Jack, promoted.
178	..	.. Wilkinson, A. E.	5.11.13	Clerical ..	.. H. D. Purnell, promoted.
1342*	..	.. Davis, H. ..	22.11.13	Nursing ..	.. H. Pettit, promoted.
1569*	..	.. Farmer, G. L.	22.11.13	.. ..	.. J. K. Jackson, promoted.
4357*	..	.. Harding, T. H.	22.11.13	1st Class Clerk	.. R. G. Harrison, promoted.
186	..	.. Fream, W. G.	22.11.13	Nursing ..	.. G. D. Salter, promoted.
192	..	.. Murray, J. ..	28.11.13	1st Class Clerk	.. P. H. Haynes, promoted.
193	..	.. Truscott, H. P.	29.11.13	Nursing ..	.. T. S. Roberts, promoted.
196	..	.. Kent, A. J. ..	7.12.13	.. ..	.. P. H. Flight, promoted.
218	..	.. Dale, L. A. ..	9.12.13	.. ..	.. W. T. Parker, promoted.
223	..	.. Peake, W. ..	12.12.13	.. ..	.. W. E. Reece, promoted.
226	..	.. Wilks, A. H. ..	16.12.13	.. ..	.. G. E. Sayers, promoted.
19167	..	.. Stokes, H. E...	22.12.13	.. ..	.. A. E. Harland, promoted.
249	..	.. Scovell, A. H...	28.12.13	General Duty	.. T. Howe, promoted.
264	..	.. Trout, A. ..	29.12.13	Nursing ..	.. H. J. Cannon, promoted.
276	..	.. Baldwin, T. D.	31.12.13	1st Class Clerk	.. T. J. Kilyon, promoted.

\* Special under para. 281, Standing Orders.

## AWARD OF ARMY FORM C 344.

The undermentioned have been awarded A.F. C 344 on the dates specified :—

No.	Rank and Name	Date	No.	Rank and Name	Date
14770	Serjt. Buckner, A. ..	22.9.10	4547	Pte. .. Lynn, G. A. ..	18.10.13
19192	L.-Srjt. Poole, F. ..	18.7.12	1798	„ .. Gilbert, R. R. ..	18.10.13
19322	Serjt. Elliott, H. ..	1.10.13	4894	„ .. Crossman, W. G. ..	22.10.13
4935	Pte. .. Andrews, W. ..	3.10.13	5023	„ .. Grist, R. ..	29.10.13
18415	Serjt. Bell, A. ..	7.10.13	1520	„ .. Spalding, A. J. ..	29.10.13
15671	„ .. Cole, R. W. ..	9.10.13	11929	Serjt. Cooper, W. J. ..	1.11.13
2255	Pte. .. Pool, L. F. ..	10.10.13	943	Pte. .. Ball, A. H. ..	19.11.13
1715	„ .. Rogers, H. G. ..	17.10.13	5214	„ .. Stanford, E. R. ..	20.11.13
2245	„ .. Cripps, A. G. ..	17.10.13			

## NURSING SECTION.

The following appointments to the Nursing Section of the Corps will take effect from the dates specified :—

No.	Rank and Name	Date	No.	Rank and Name	Date
6668	Pte. .. Benham, R. G. ..	1.7.13	7062	Pte. .. Leonard, L. M. ..	12.11.13
*1348	„ .. Abbess, S. G. ..	7.10.13	6772	„ .. Griffith, F. ..	13.11.13
6384	„ .. Hill, W. ..	8.10.13	6893	„ .. Chubb, A. ..	13.11.13
6598	„ .. Edwards, F. G. ..	8.10.13	6913	„ .. Lord, J. H. ..	18.11.13
6566	„ .. Mackenzie, J. M. ..	8.10.13	*5990	„ .. Martin, W. H. ..	21.11.13
6664	„ .. Turfrey, E. H. ..	8.10.13	6826	„ .. Morgan, A. W. ..	21.11.13
6686	„ .. Asplin, G. E. ..	8.10.13	6993	„ .. Thompson, H. ..	25.11.13
6802	„ .. Ball, A. C. ..	8.10.13	2040	„ .. Freeston, J. H. ..	26.11.13
6277	„ .. Clarke, H. E. ..	17.10.13	6788	„ .. Fraser, A. G. ..	27.11.13
6690	„ .. Machin, P. ..	21.10.13	7013	„ .. Wall, S. ..	27.11.13
6700	„ .. Elliot, A. ..	21.10.13	7107	„ .. Stanley, C. W. ..	27.11.13
6746	„ .. Wilson, G. ..	21.10.13	1805	„ .. Geary, R. ..	29.11.13
6767	„ .. Duggan, W. ..	21.10.13	6149	„ .. Simmons, W. ..	29.11.13
6832	„ .. Latache, J. F. ..	21.10.13	7407	„ .. Rich, C. ..	29.11.13
6884	„ .. Griffin, J. ..	21.10.13	6970	„ .. Small, W. G. ..	2.12.13
1905	Cpl. .. Eves, J. G. ..	24.10.13	4738	„ .. Dell, G. L. ..	5.12.13
5853	Pte. .. Wood, H. J. ..	24.10.13	6661	„ .. Mayhew, H. J. ..	5.12.13
6499	„ .. Gillam, T. ..	24.10.13	6663	„ .. Pickersgill, E. ..	6.12.13
6927	„ .. Nott, T. H. ..	24.10.13	6932	„ .. Stewart, H. W. M. ..	6.12.13
6936	„ .. Jordan, H. W. ..	24.10.13	6935	„ .. Beavers, E. ..	6.12.13
5440	„ .. Price, J. R. ..	31.10.13	7032	„ .. Loveridge, R. H. ..	6.12.13
5848	„ .. Kay, J. ..	31.10.13	911	L.-Cpl. Clough, W. ..	8.12.13
6189	„ .. Butler, W. ..	31.10.13	5690	Pte. .. Breese, H. E. ..	8.12.13
6473	„ .. Lloyd, W. ..	31.10.13	7025	„ .. Hails, G. A. ..	8.12.13
6721	„ .. Donnelly, P. ..	31.10.13	6178	„ .. Crookes, F. W. ..	13.12.13
18988	Cpl. .. Haigh, R. H. T. ..	6.11.13	6421	„ .. Page, J. R. ..	13.12.13
6814	Pte. .. Osman, C. ..	6.11.13	6704	„ .. Cooper, F. ..	13.12.13
2289	„ .. Harris, H. P. ..	7.11.13	6705	„ .. Spring, E. E. ..	13.12.13
5746	„ .. Young, H. ..	11.11.13	6934	„ .. Fisher, W. H. ..	13.12.13
6743	„ .. Garrity, J. E. ..	12.11.13	5365	„ .. Coombs, E. ..	16.12.13
6869	„ .. Littlefield, C. ..	12.11.13	6027	„ .. Sykes, H. ..	30.12.13
6974	„ .. Holmes, J. ..	12.11.13	6938	„ .. Akhurst, S. C. ..	30.12.13
6978	„ .. Stone, W. H. ..	12.11.13	6378	„ .. Miles, F. E. ..	13.12.13
6980	„ .. Hall, J. ..	12.11.13			

\* Re-appointed.

## ADVANCEMENT OF PRIVATES (CORPS PAY).

The following advancements in rate of Corps Pay will take effect from January 1, 1914 :—

*To be Advanced to the Third Rate (at 8d.).*

*As Orderlies.*

No.	Name	No.	Name	No.	Name
1092	King, E. B.	4391	Smith, G.	5566	Douce, T.
1363	Green, H.	4403	Privett, B. J.	5611	Swatton, E. A.
1375	Shipton, H.	5083	Salway, T.	5634	Burton, V. M.
2193	Williams, J.	5374	Cox, J. W.	5679	Couzens, W. N. S.
4301	Locke, C. R.	5481	Watts, J. C.	5737	Brown, H.
<i>As Clerks.</i>					
5430	Dickson, S.	6018	Pilgrim, A. J.	6640	Underhill, T. G.
5935	Purser, R. H.	6060	Pegg, R. W. G.		

*As Superintending Cook.*

No. 992 Killigrew, H.

*To be Advanced to the Fourth Rate (at 6d.).*

*As Orderlies.*

1746	McLachlan, E. J.	5860	Rhodes, C.	6217	Schoenthal, C.
1861	Simmons, J. C. R.	5877	Hilton, R.	6275	Smith, J. S.
4939	Hunter, F. N. E. S.	5911	Howard, H. J.	6320	Clark, M. G.
5014	Bitten, G. J.	5937	Withers, F. A.	6340	Jones, S. A.
5329	Beer, H. G.	5965	Whiddett, P.	6378	Miles, F. E.
5444	Holdup, G. W.	6001	Bellerby, H.	6461	Chapman, G. W.
5553	Sartin, H. F.	6099	Corcoran, J. A.	6496	Robertson, J.
5621	George, H. J.	6159	Seabrook, J. E. L.	6518	Smith, T. G.
5728	Biltcliffe, T.	6202	Dobson, H.	6617	Goodwin, R. A.

*As Cooks.*

114	Snow, W. J.	6366	Edwards, H.	6520	McPherson, G.
2019	Williamson, S. J.	6368	Gainsbury, J. A. T.	6532	Garrood, E. E.
5590	Forsyth, W. P. A.	6388	Lillyman, H.	6697	Davis, R. J.
4874	Cripps, A. W.	6407	O'Farrell, W. M.		
6091	Townsend, B.	6478	Leake, H.		

## SANITARY ORDERLIES.

The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, from the dates specified :—

No.	Name	Date	No.	Name	Date
5820	Clarke, B. F. A.	.. 6.9.13	750	Woodward, W. A.	.. 26.10.13
5909	Kelly, F.	.. 17.9.13	5497	Greenhill, J. C.	.. 28.10.13
4892	Flint, B. W.	.. 18.9.13	5678	Ford, R. H.	.. 1.11.13
6151	Sanders, W. H.	.. 21.9.13	15696	Page, W. A.	.. 3.11.13
6336	Behr, C. T.	.. 27.9.13	5887	Groves, W. H.	.. 6.11.13
6567	Warren, F. R.	.. 27.9.13	5744	Gordon, H.	.. 14.11.13
5675	Cleary, P.	.. 2.10.13	5991	Smith, G.	.. 17.11.13
6170	Gibbs, A. E.	.. 2.10.13	5089	Brisbane, W.	.. 22.11.13
6613	Frater, C. H.	.. 7.10.13			

## BUGLERS.

The following boys are appointed Buglers from the dates specified :—

No.	Name	Date	No.	Name	Date
6597	Fry, H. .. ..	3.12.13	6641	Pegg, J. J. .. ..	15.12.13

## ADVANCEMENT CORPS PAY CANCELLED.

The advancement of the undermentioned Private to the Fourth Rate of Corps Pay at 6d., as an Orderly, is hereby cancelled.

No. 5656 Ware, J.

## THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS.

## FOR SERJEANT.

17974	Corporal ..	Moon, F. V.	18982	Corporal ..	Newman, A.
15683	Lce.-Serjt.	Dent, T. P.			

## FOR CORPORAL.

5935	Private ..	Purser, R. H.	5901	Private ..	Johnson, J. E.
6003	„ ..	Burns, J.	7112	„ ..	Holtsbaum, F.

## DISEMBARKATIONS FROM ABROAD.

## FROM N. CHINA, PER H.T. "SOUDAN," JANUARY 13, 1914.

11141	Sjt.-Major	Coggon, T. E.	1772	Private ..	Butler, M. A.
1424	Private ..	Ryan, J.			

## FROM MAURITIUS, PER H.T. "SOUDAN," JANUARY 13, 1914.

10259	Sjt.-Major	Higdon, F.	1831	Lce. - Serj.	Riley, S. T.
19001	Corporal ..	Barritt, J.	17794	Corporal ..	Beckett, W. A.
17820	„ ..	Peckham, H.	73	Lce.-Corpl.	Ellard, F.
1669	Private ..	Frery, R.	4393	Private ..	Hargrave, T. B.
6816	„ ..	Johnstone, W.	19055	„ ..	Reed, W. R.
1438	„ ..	Ridehalgh, G. L.	1738	„ ..	Worster, W. E.

## FROM S. AFRICA, PER H.T. "SOUDAN," JANUARY 13, 1914.

4431	Private ..	Lumby, R. C.	6	Private ..	Nelms, W. J.
1448	„ ..	Moore, W.			

## EMBARKATIONS FOR ABROAD.

## TO GIBRALTAR, PER H.T. "SOUDAN," JANUARY 24, 1914.

6465	Private ..	Todd, C.	5795	Private ..	Gordge, F. G.
5745	„ ..	Jones, D.	6303	„ ..	Fullager, W.

## TO EGYPT, PER H.T. "SOUDAN," JANUARY 24, 1914.

13388	Staff-Serjt.	Boxshall, H. S.	12651	Serjeant ..	Bennett, R. H.
18324	Serjeant ..	Parker, D.	17165	Corporal ..	Holloway, F. T.
1825	Lce.-Corpl.	Williams, A. G.	5470	Private ..	Goreham, W. A.
6275	Private ..	Smith, J. S.	5911	" ..	Howard, H. J.
5869	" ..	Carew, P.	5883	" ..	Bray, C.
5307	" ..	Garley, S. W.	5806	" ..	Stevens, E. S.
5796	" ..	Dixon, W. V.	5687	" ..	Wright, G.
5402	" ..	Sexton, P.	6060	" ..	Pegg, R. W. G.
5332	" ..	Carter, G.	5760	" ..	Bishop, S.
5765	" ..	Sturgeon, A. L.	6321	" ..	Stewart, A. E.
6153	" ..	Tucker, O. P.	5854	" ..	Newby, W.
5948	" ..	Hunter, W. J.	5329	" ..	Beer, H. G.

## TO MALTA, PER H.T. "SOUDAN," JANUARY 24, 1914.

10648	Sjt.-Major	Hughes, J. F.	11714	Qmr.-Serjt.	Kerstein, E.
11554	Qmr.-Serjt.	Spencer, R.	15813	Serjeant ..	Heggie, A. V.
14668	Serjeant ..	Amsden, A.	17001	Corporal ..	Blair, D.
1406	Lce.-Corpl.	Newland, F. H.	5392	Private ..	Moyse, R.
5955	Private ..	Dolan, W.	5717	" ..	Blair, T. W.
5224	" ..	Barnard, J. F.	5144	" ..	Smith, A.
5768	" ..	Littlemore, S. H.	5650	" ..	Harrott, F. W.
5250	" ..	King, H. T.	5643	" ..	Preen, H.
5800	" ..	Hollier, F. J.	5214	" ..	Stanford, E. R.
4939	" ..	Hunter, F. N. E. S.	5355	" ..	Benson, W. G.
5618	" ..	Faichney, P.	6030	" ..	Wren, J. T.
5644	" ..	Holcomb, N. H.	5476	" ..	Warwick, W. H.
5135	" ..	Caudell, C. H. J.	5850	" ..	Parrott, C.
5554	" ..	Lillis, E. A.	5646	" ..	Holdup, P. L.
5372	" ..	O'Flaherty, J.	5457	" ..	McGrath, W.
5926	" ..	Dermody, R. J.	2040	" ..	Freeston, J. H.
5171	" ..	Eason, W. E. L.	5354	" ..	Coffey, J.
5347	" ..	Lawson, W. R.	5686	" ..	Brookes F. G.

## TO SIERRA LEONE, PER S.S. "BATANGA," FEBRUARY 3, 1914.

16474	Serjeant ..	Lowery, W.	16132	Corporal ..	Miller, J. E.
18906	Corporal ..	Whyatt, T. G.	223	Lce.-Corpl.	Peake, W.
1336	Private ..	Dovey, C.	1785	Private ..	Phillips, W. J.

## DISCHARGES.

9936	Qmr.-Serjt.	Allwork, H.	..	5.2.14	Termination of second period.
9953	Staff-Serjt.	Lovegrove, E. J.	..	15.2.14	" " "
9935	Lce.-Serjt.	Metherell, W.	..	1.2.14	" " "
16980	Private ..	Stuart, S. K.	..	12.1.14	Termination of first period.
7492	" ..	Harris, A. M.	..	27.1.14	On payment of £10.
18628	" ..	Pemberton, G.	..	10.2.14	Medically unfit.

## TRANSFERS FROM OTHER CORPS.

10074	Staff-Serjt.	Wilkins, H. W.	..	24.1.14	From O.T. Corps, Dublin.
7526	Private ..	Fillery, T.	..	1.1.14	" 2ndBn. "The Queen's" Rgt.

## TRANSFER TO OTHER CORPS.

16678	Serjeant ..	March, J. E.	..	23.1.14	To O.T. Corps, Dublin.
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## APPOINTED BUGLERS.

6762	Boy	..	Tomlin, T. ..	..	13.1.14	Vice Wigley to the ranks.
6695	„	..	Osborne, R.	..	30.1.14	„ Tuson „ „

## DEATH.

9160	Corporal ..	Murdock, S. G. ..	18.1.14	Aldershot. Bright's disease.
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## TRANSFERS TO ARMY RESERVE.

5274	Pte.	Battersby, R. ..	19.1.14	19700	Pte.	Hopwood, C. F.	1.1.14
5245	„	Betts, W. ..	1.1.14	5285	„	Bellingham, C. H.	26.1.14
5247	„	Everett, S. V. ..	2.1.14	5287	„	Gooch, T. W. ..	27.1.14
5263	„	Romney, T. A. ..	8.1.14	5290	„	Hadfield, E. ..	31.1.14
5265	„	Flook, R. J. ..	11.1.14	5296	„	Howard, A. O. ..	1.2.14
5261	„	Scott, L. McP. ..	10.1.14	5292	„	Johnson, A. ..	2.2.14
5270	„	Wardrop, R. A. ..	11.1.14	5288	„	Heale, A. G. ..	27.1.14
5353	„	Harris, J. ..	15.1.14	5297	„	Postans, H. H. ..	3.2.14
5264	„	Roberts, F. G. ..	11.1.14	5316	„	Wall, W. G. H.	12.2.14
5271	„	Taylor, S. J. H.	16.1.14	5304	„	Cocklin, J. ..	9.2.14
5273	„	Smith, C. G. ..	17.1.14	5303	„	Messenger, A. ..	8.2.14
1074	„	Smithdale, G. C.	10.1.14	5302	„	Hayter, J. W. ..	8.2.14
4521	„	Clark, A. ..	18.1.14	5300	„	Reynolds, J. ..	7.2.14
5269	„	Gilbert, H. C. ..	16.1.14	5330	„	Stretch, T. W. ..	26.2.14
5283	„	Frisby, S. H. ..	23.1.14	5299	„	Kendrick, H. ..	6.2.14
5282	„	Hurlock, H. E. ..	24.1.14	5318	„	Turner, M. ..	15.2.14
5286	„	Williams, A. ..	25.1.14	5321	„	Graham, W. ..	16.2.14

**NOTES FROM LONDON.**—Colonel Sir Edward Ward, late P.U.S., was entertained at a farewell dinner at the Royal Army Medical Corps Mess, on Tuesday, February 24, the Director-General presiding. The following guests were invited to meet him: Sir R. Havelock Charles, Sir Reginald Brade, Sir John Rose Bradford, Sir Anthony Bowlby, Sir Charles Cameron, Colonel Harper, Colonel Hemming, Dr. Leonard Hill, Dr. H. R. Kenwood, Messrs. B. B. Cubitt, H. C. Gordon, E. B. Charteris, and E. T. Gann.

**NOTES FROM CAIRO.**—Lieutenant C. W. Kinsella, Quartermaster No. 33 Company, R.A.M.C., writes: "In view of the departure for England of several members and honorary members of their mess, the serjeants of the company held a farewell dinner, followed by a smoking concert, on the evening of January 29.

"Serjeant-Major Houston presided, and was supported by Serjeant-Major Barker, M.P.S.C., and Schoolmaster Clarkson, the gathering of thirty also including representatives from the various corps in garrison.

"The menu, which was prepared under the supervision of Serjeant Wilkin (Superintending Cook), was as follows:—

Soupe à la Tomato.	
Poisson Mayonnaise.	
Ris de Veau Pattés.	
Roti de Bœuf.	Sauce au Radis.
Sauce Blanche.	Chou-fleur.
Pommes de Terre Cuites.	
Dindon Roti.	Petits Pois Verts.
Pommes de Terre Pourrées.	
Scotch Woodcock.	
Crème Italienne.	
Compôte d'Oranges.	
Dessert.	
Claret Cup.	Liqueurs. Café.

"The band of the 1st Worcester Regiment (by kind permission of Lieutenant-Colonel Lascelles and officers) played the following programme during dinner :—

<i>Selection</i> .. .. .	' Ragtime Review '	.. .. .	<i>Pether.</i>
<i>Two-Step</i> .. .. .	' Oh ! You Beautiful Doll '	.. .. .	<i>Brown.</i>
<i>Valse</i> .. .. .	' A Dance Dream '	.. .. .	<i>Wurm.</i>
<i>Two-Step</i> .. .. .	' The Gaby Glide '	.. .. .	<i>Hirsch.</i>
<i>Valse</i> .. .. .	' Nights of Gladness '	.. .. .	<i>Ancliffe.</i>
<i>Galop</i> .. .. .	' John Peel '	.. .. .	<i>Hunt.</i>

"After the usual loyal toasts had been duly honoured, the Chairman proposed the health of the 'departing members,' and expressed all good wishes for their future, sentiments which were enthusiastically seconded by the company with musical honours, and feelingly responded to by Serjeant Moore, R.A.M.C., and Serjeant-Major Barker, M.P.S.C.

"When all had done justice to the ample menu provided, the tables were cleared and a 'smoker' whiled away the remainder of the evening, the principal turns being :—

<i>Overture</i> .. .. .	' Ruy Blas '	.. .. .	BAND, WORCESTER REGT.
<i>Song</i> .. .. .	' I Must Go Home To-night '	.. .. .	Serjt.-Major BARKER.
<i>Song</i> .. .. .	' Kathleen Mavourneen '	.. .. .	Mr. HEADLAND.
<i>Duet</i> .. .. .	' Two Little Maids '	.. .. .	Misses IRENE KINSELLA and ADA WILKIN.
<i>Ballad</i> .. .. .	' The Flight of Ages '	.. .. .	Staff-Serjt. WILSON.
<i>Song</i> .. .. .	' The Old Brigade '	.. .. .	Lieut. KINSELLA.
<i>Comic Song</i> .. .. .	' Welcoming him in '	.. .. .	Serjt. JOHNSON.
<i>Ballad</i> .. .. .	' Sweet Genevieve '	.. .. .	Qmr.-Serjt. CONOLLY.
<i>Comic Song</i> .. .. .	' Toddling Home '	.. .. .	Serjt. HARRIS.

"The toasts of 'Our Officers' and 'Our Guests' were proposed by the Chairman and received with musical honours, the former being responded to by Major T. J. Potter, R.A.M.C., who in the course of his remarks emphasized the good work which had been done by the departing members, and congratulated the serjeants' mess on the excellent entertainment provided.

"To Quartermaster-Serjeant Conolly and his energetic Committee must be tendered hearty congratulations on the excellent arrangements carried out.

"Amongst the officers present were Major Potter, Captains Leeson and Field, Lieutenants Chambers, Biggar, Kinsella and Green.

"On February 4 the rank and file held a farewell concert to speed some twenty members leaving for home, the 'Farmyard Imitations' of Private Schoenthal and the appearance of Private Wilkins in the disguise of an Egyptian 'bint' being two of the hits of the evening.

"Serjeant-Major Houston filled the chair admirably, and the toast of 'Departing Comrades' was accorded a 'three times three.'

"The home-going draft departed on the H.T. 'Soudan' on February 6.

#### "PROGRAMME.

##### PART 1.

(1) <i>Pianoforte Solo</i> .. .. .	' The Battle March of Delhi '	.. .. .	Serjt. HARRIS.
(2) <i>Comic Song</i> .. .. .	' Old Brown Hat '	.. .. .	Pte. HOCHHEIMER.
(3) <i>Song</i> .. .. .	' Son of the Desert '	.. .. .	Pte. SCHOENTHAL.
(4) <i>Comic Song</i> .. .. .	' The Wibbly Wobbly Walk '	.. .. .	Pte. WILKINS.
(5) <i>Song</i> .. .. .	' The Trumpeter '	.. .. .	Lieut. KINSELLA.
(6) <i>Comic Song</i> .. .. .	' There's Something in the Seaside Air '	.. .. .	Pte. TROUT.
(7) <i>Recitation</i> .. .. .	' Gunga Din '	.. .. .	Ptes. PASSINGHAM and MOGFORD.
(8) <i>Chorus Song</i> .. .. .	' Toddling Home '	.. .. .	Serjt. HARRIS.
(9) <i>Comic Song</i> .. .. .	' Welcoming him in '	.. .. .	Serjt. JOHNSON.
(10) <i>Song</i> .. .. .	' Why do you keep laughing at me ? '	.. .. .	Lce.-Corpl. DAUNT.
(11) <i>Song</i> .. .. .	' Kitty dear '	.. .. .	Pte. EDWARDS.
(12) <i>Song</i> .. .. .	' Bonny Mary of Argyle '	.. .. .	Pte. MOODY.
<i>Toast</i> .. .. .	' Departing Comrades '	.. .. .	THE CHAIRMAN.
(13) <i>Pianoforte Solo</i> .. .. .	' Angelina '	.. .. .	Lce.-Corpl. RONEY.

(14) *A Grand Farcical Sketch entitled—*

## ‘THE OBITUARY POET.’

Scene—Editorial Office of the *Weekly Argus*—Out West.

Colonel Bangs, Editor of the <i>Weekly Argus</i> ..	Pte. BALL.
Mr. Joseph Todges	Pte. HOCHHEIMER.
Mr. William McGlue	Pte. SCHOENTHAL.
Mrs. Clementina Smith	Pte. TOMLYN.
Mr. Timothy Titcombe	Pte. WILKINS.
Jonathan J. Joskins, Esq., Sheriff of the County	Pte. DEDOW.
Mr. Brian Boru	Pte. PASSINGHAM.

## “Interval.”

## PART 2.

- |                                |   |                          |
|--------------------------------|---|--------------------------|
| (1) Song .. ..                 | ‘The Veteran’s Song’ .. ..                            | Pte. GODDEN.             |
| (2) Comic Song .. ..           | ‘The Marriage Alphabet’ .. ..                         | Pte. TROUT.              |
| (3) Song .. ..                 | ‘The Boys of the Old Brigade’ .. ..                   | Lieut. KINSELLA.         |
| (4) Whistling Solo .. ..       | ‘Killarney’ .. ..                                     | Pte. HOCHHEIMER.         |
| (5) Song .. ..                 | ‘Someone’ .. ..                                       | Lce.-Corpl. DAUNT.       |
| (6) Comic Song .. ..           | ‘The Village Pump’ .. ..                              | Serjt. JOHNSON.          |
| (7) Recitation .. ..           | ‘Trooping’ .. ..                                      | Pte. PASSINGHAM.         |
| (8) Ragtime Duet .. ..         | ‘Waiting for the Robert E. Lee’ .. ..                 | Ptes. TROUT and WILKINS. |
| (9) Song .. ..                 | ‘Thora’ .. ..   | Pte. MOODY.              |
| (10) Farmyard Imitations .. .. | .. ..   | Pte. SCHOENTHAL.         |
| (11) Chorus Song .. ..         | ‘Girl in Havana’ .. ..                                | Serjt. HARRIS.           |
| Toast .. ..                    | ‘Response to Chairman’ .. ..                          | Corpl. FLOOD.            |
| (12) Comic Song .. ..          | ‘I want to be pally with everyone’ .. ..              | Pte. WILKINS.            |
| (13) Song .. ..                | ‘Where the Sunset turns the Ocean Blue to Gold’ .. .. | Pte. EDWARDS.            |
| (14) .. ..                     | { ‘Auld Lang Syne’<br>‘The Doctor’s Battle Song’ }    | .. .. EVERYBODY.         |

## ‘GOD SAVE THE KING.’

‘During the evening Private SANSFIELD will amuse the Company with a few of his many conjuring tricks.’”

**NOTES FROM CEYLON.**—“One of the few blessings of life in Ceylon is the trooping season, for which, no doubt, the few who left us last November are indeed grateful.

“Our people came on the Freightsip ‘Malda,’ with the exception of Captain Meredith and Serjeant-Major Powell and his family. Captain Worthington left us earlier than the remainder of the home-going draft, having to do duty on the ‘Somali’ from here to Hong-Kong. Serjeant-Major Dring went home on the P. and O. ‘Syria,’ which sailed on November 12; the remainder of the draft went home on the troopship. The changes were few, only five rank and file being sent home. We hope they all survived the journey and got good stations.

“The company has had a very successful time during the past twelve months, and quite a good number of examinations have been passed by the men. The new General Officer Commanding made an inspection of the company, both at the daily duties and on drill parade. The following extract from his report is sufficient to show the opinion we created upon him:—

“‘The 26th Company, Royal Army Medical Corps, is very efficient in its duties, and is quite fit for war.

“‘The men are well instructed and perform their work well. They are efficient in stretcher drill. They are of good physique and fit, having a sports club and tennis club, both well supported.’

“As regards the sport of the company, it has been the most successful year we have had.

“At the Nuwara Eliya Easter Golf Tournament the Cup presented by His Excellency Sir Henry McCallum, G.C.M.G. (late Governor of Ceylon), and the silver medal, were won by Lieutenant-Colonel M. L. Hearn. He was defeated on the nineteenth green for the Captain’s Cup.

“Major P. G. Hyde won a nomination to compete for the Captain’s Cup, Nuwara Eliya Golf Club, during the current year.

"Captain F. Worthington won several tennis events both at Nuwara Eliya and at Colombo.

"In the Football League we finished up as well as we expected, being only one behind the winners, who are the 93rd Company, Royal Garrison Artillery. Considering they are over 200 strong, whilst our strength is but twenty-two, it must be admitted that ours was a very good performance. The fact that we had men away at camp during the League season was also against us, but with the assistance of two non-commissioned officers of the Army Service Corps, who are attached to us, we managed to keep our expectations. Next year we are going to make a great attempt to go one better and win the League.

"The hockey team had a very successful time, winning a great many more matches than they lost, but as there was not a league competition, no record has been kept.

"Our tennis club is still going strong, the court being the envy of the rest of the garrison. The Junior N.C.Os. of the Royal Garrison Artillery are endeavouring to form a club, so we shall have plenty of good sport in that line later on.

"Our dance club is a great success. We hold a monthly dance, and it is largely attended, being generally admitted as the best in the garrison.

"Hardly had the troopship left when arrangements were commenced to prepare for the festive season. The catering part of the programme was again placed in the hands of Corporal Green, who served us in that capacity last year. The dinner was voted a great success, the following menu saying all that is necessary :—

#### "MENU.

<i>Soup.</i>	<i>Vegetables.</i>
Tomato Purée.	Potatoes. Green Peas.
<i>Fish.</i>	Cabbage.
Boiled Seer.	<i>Sweets.</i>
Anchovy Sauce.	Christmas Pudding and Brandy Sauce.
<i>Poultry.</i>	Mince Pies.
Roast Turkey.	Prunes and Custard.
Roast Goose.	Blancmange.
<i>Joints.</i>	<i>Fruit.</i>
Cold Roast Beef.	Bananas. Oranges.
Cold Boiled Ham.	Nuts.

"The Commanding Officer and Captain Meredith came round at dinner time, and the usual speeches were made. Compliments of the season were passed, musical honours given, and all were in a very merry mood. A thing that was greatly appreciated by the men was the good spirit shown by our seniors, who left their homes to come and wait upon us at dinner so that we could all sit down together.

"The junior non-commissioned officers and men of the Army Ordnance Corps spent Christmas Day with us, as did also Mr. Robertson, Assistant Superintendent of Surveys, who is a great friend of the Company, and well known to old members of No. 26.

"We had a smoking concert on Christmas night. A good number of outside people were invited, and, as we anticipated, they all turned up.

"The decorations were greatly admired, the centre of attraction being a replica of the Corps badge and motto, in gold, which formed the background of the stage.

"The concert, which went with a swing with the majestic hammer in the hands of Corporal Pitt, was excellent; all the items were good, and well appreciated by the audience.

"The following, with a few additions as extra turns, &c., is the programme :—

#### "PROGRAMME.

##### PART I.

(1) <i>Overture</i>	.. ..	'War March of the Priests'	.. ..	Spr. GEE.
(2) <i>Song</i>	.. ..	'Joshua-ah'	.. ..	Corpl. PLAYFORD.
(3) <i>Song</i>	.. ..	'I belong to a Birthday Club'	.. ..	Pte. PARR.
(4) <i>Song</i>	.. ..	'Why do you keep laughing at me?'	.. ..	Pte. BRISBANE.
(5) <i>Song</i>	.. ..	'Let's all go Mad'	.. ..	Pte. BRUNT.
(6) <i>Song</i>	.. ..	'Ten Little Fingers'	.. ..	Pte. JACOMB.
(7) <i>Song</i>	.. ..	'On the Road to Mandalay'	.. ..	Staff-Serjt. DRUMMOND.

(8) Song .. ..	'Saturday afternoon till Monday morning'	Corpl. GREEN.
(9) Song .. ..	'The Rosary' .. ..	.. Spr. BOWES.
(10) Song .. ..	'Follow the Footprints in the Snow' ..	Pte. LILYWHITE.
(11) Song .. ..	'Thora' .. ..	Qmr.-Serjt. STARKIE.
(12) Song .. ..	'Shift up a little bit further' ..	Qmr.-Serjt. MCCREETH.
(13) Song .. ..	'Asleep in the Deep' .. ..	Corpl. ROBERTS.
(14) Duologue .. ..	'The Dandies' .. ..	Corpl. BURD and Spr. BRINDLE.
(15) Song .. ..	'One Touch of Nature' .. ..	Mr. ROBERTSON.
(16) Song .. ..	Selected .. ..	S. M. POWELL.

"(Interval.)"

#### PART II.

(1) Pianoforte Selection..	.. ..	.. ..	.. ..	.. ..	.. ..	Spr. GEE.
(2) Song .. ..	.. ..	Selected	.. ..	.. ..	.. ..	Qmr.-Serjt. STARKIE.
(3) Song .. ..	.. ..	'Stammering Sam'	.. ..	.. ..	.. ..	Corpl. GREEN.
(4) Song .. ..	.. ..	Selected	.. ..	.. ..	.. ..	Spr. BOWES.
(5) Recitation .. ..	.. ..	'The Dandy Fifth'	.. ..	.. ..	.. ..	Corpl. MCCAIG.
(6) Song (Comic).. ..	.. ..	'Nora Malone'	.. ..	.. ..	.. ..	Corpl. PLAYFORD.
(7) Song .. ..	.. ..	'Oh, you beautiful Doll'	.. ..	.. ..	.. ..	Spr. BRINDLE.
(8) Song .. ..	.. ..	'True till Death'	.. ..	.. ..	.. ..	Staff-Serjt. DRUMMOND.
(9) Song .. ..	.. ..	'East and West'	.. ..	.. ..	.. ..	Qmr.-Serjt. MCCREETH.
(10) Song .. ..	.. ..	'There's a Girl in Havana'	.. ..	.. ..	.. ..	Pte. PARR.
(11) Song .. ..	.. ..	'He played on his fiddle'	.. ..	.. ..	.. ..	Pte. BRUNT.
(12) Song .. ..	.. ..	'No ! No ! No !'	.. ..	.. ..	.. ..	Corpl. ROBERTS.
(13) Song .. ..	.. ..	'Dear old Pal'	.. ..	.. ..	.. ..	Serjt. WADE.
(14) Song .. ..	.. ..	'O. O. Capital O.'	.. ..	.. ..	.. ..	Pte. ARDREY.
(15) Song .. ..	.. ..	'Wallo Peru'	.. ..	.. ..	.. ..	Pte. BRISBANE.
(16) Song .. ..	.. ..	'The Sweep'	.. ..	.. ..	.. ..	Mr. ROBERTSON.

"GOD SAVE THE KING."

"Programme arranged by Corpl. Playford."



"All were in great form, but the chief successes were 'Follow the Footprints,' by Private Lilywhite, who, with the assistance of his chorus, Privates Brunt and Parr, caused immense fun. 'Stammering Sam,' by Corporal Green, and 'Ten Little Fingers,' by Private Jacomb, were also appreciated to the utmost extent, whilst Corporal Playford's rendering of 'Nora Malone' deserved all the applause it got, and he was not allowed to leave the stage until we had had it over again. Serjeant-Major Powell also augmented his turn with a few strains on the clarinet.

"The titbit of the evening came about 12.30 a.m., when Mr. and Mrs. Melbourne (who are professional variety artists, and great favourites in Colombo) paid us a visit, and each gave us a couple of songs.

"That the concert was a success is testified to by the fact that the ladies and children remained till the last item had been gone through. It is quite an innovation for ladies and children to be present at a smoking concert, but we started the idea the previous Christmas, and the same thing was done this year.

"How many of our comrades can recognize friends in the photograph, which is a group of our principal artists at the concert?

"On Boxing Day a walking football match—married versus single—was played, and was the most amusing event we have had for some time. In the evening we had another smoking concert.

"Our New Year's dance was a grand success, the floor being crowded in spite of other attractions which were taking place the same night.

"From the above notes it will be seen we had a jolly good Christmas, and now, having got over the excitement, we have settled down again to our work and studies, all hoping to go up country for a change of air. Some will get their wish, and some will not, but as long as the troopship keeps coming and going, we shall not grumble."

**NOTES FROM MAURITIUS.**—Private Blake writes: "Christmas Day in Mauritius was celebrated as follows by No. 31 Company.

"The day commenced with a réveillé by our Creole Band at 6 a.m."

"After the patients had been made as happy as possible with a good dinner, the Company sat down to an excellent spread, and paid a good compliment to Corporal Whyatt's cooking, the senior N.C.Os. waiting at table.

"In the evening, as is usual every year, we were kindly invited to a splendid concert by the 43rd Company, R.E., which was much enjoyed by all who were able to go.

"On Boxing Day we held our own concert and entertained our married establishment and the Royal Engineers. Staff-Serjeant Walls most ably presided, and an excellent programme was got through. Our C.O., Captain MacArthur, and Lieutenant L'Estrange were present, and stayed nearly to the end. In a few suitable words Staff-Serjeant Walls proposed the toast of 'Our Officers,' which was well responded to. Captain MacArthur later proposed the health of 'The Ladies.'

"The entertainment was kept up until the early hours of the morning, a most enjoyable time having been spent.

#### "PROGRAMME.

- |                                 |       |  |                                 |                |
|---------------------------------|-------|--|---------------------------------|----------------|
| (1) <i>Pianoforte Selection</i> | .. .. | —                                      | .. ..                           | Mr. PRITCHARD. |
| (2) <i>Song</i> .. ..           | .. .. | 'Queen of the Earth'                   | Pte. MATTISON, R.A.M.C.         |                |
| (3) <i>Song</i> .. ..           | .. .. | 'The Veteran's Song'                   | Pte. COLES, R.A.M.C.            |                |
| (4) <i>Song (Comic)</i>         | .. .. | 'We've all been doing a bit'           | Spr. RAE, R.E.                  |                |
| (5) <i>Song</i> .. ..           | .. .. | 'On the Road to Mandalay'              | Capt. W. P. MACARTHUR, R.A.M.C. |                |
| (6) <i>Song (Comic)</i>         | .. .. | 'On Top'                               | Pte. WARD, R.A.M.C.             |                |
| (7) <i>Song</i> .. ..           | .. .. | 'Land of my Fathers'                   | Lce.-Corpl. WEBB, R.A.M.C.      |                |
| (8) <i>Song (Comic)</i>         | .. .. | 'Oh, what a Mouth!'                    | Serjt. CONNER, R.A.M.C.         |                |
| (9) <i>Song (Comic)</i>         | .. .. | 'That's the reason now I wear a Kilt'  | Spr. WINCHESTER, R.E.           |                |
| (10) <i>Song</i> .. ..          | .. .. | 'When they ask you what your name is'  | Gr. BARMAN, R.A.                |                |
| (11) <i>Song (Comic)</i>        | .. .. | 'The Pantomime'                        | Pte. WARD, R.A.M.C.             |                |
| (12) <i>Song</i> .. ..          | .. .. | 'Then You'll remember Me'              | Pte. MATTISON, R.A.M.C.         |                |
| (13) <i>Song</i> .. ..          | .. .. | 'I don't care if there's a girl there' | Pte. HARRIS, R.A.M.C.           |                |
| (14) <i>Song</i> .. ..          | .. .. | 'The Trumpeter'                        | Capt. W. P. MACARTHUR, R.A.M.C. |                |
| (15) <i>Song (Comic)</i>        | .. .. | 'Playing the game in the West'         | Spr. RAE, R.E.                  |                |
| (16) <i>Song</i> .. ..          | .. .. | 'Varmer Giles'                         | Pte. FOSH, R.A.M.C.             |                |
| (17) <i>Song</i> .. ..          | .. .. | 'One of the Upper Ten'                 | Corpl. DAVIS, R.A.              |                |
| (18) <i>Song</i> .. ..          | .. .. | 'Mary of Argyle'                       | Lce.-Corpl. WEBB, R.A.M.C.      |                |
| (19) <i>Song (Comic)</i>        | .. .. | 'Arrah! go on'                         | Lce.-Corpl. MORRIS, R.A.M.C.    |                |



(20) Song.. ..	.. 'It all depends upon the Gee-gee'	Pte. Fosh, R.A.M.C.
(21) Song (Comic)	.. 'Four fingers and a thumb'	.. Serjt. NETTLE, R.A.M.C.
(22) Song (Comic)	.. .. 'Lazy'	.. Serjt. CONNER, R.A.M.C.
(23) Song ..	'The song that made me live for ever'	Qmr.-Serjt. READ, R.E.
(24) Song ..	.. .. 'Foo the Noo'	Staff-Serjt. GLOVER, R.E.
(25) Song ..	.. 'Who were you with last night?'	.. Spr. RAE, R.E.

"On Saturday, December 27, a successful whist drive and dance were held in the Brick Block, a good company being present. The prizes fell to the following: Ladies, 1st, Mrs. Nettle; 2nd, Mrs. Dale, R.G.A.; booby, Mrs. Conner. Gents, 1st, Lance-Corporal Webb; 2nd, Private Jones; booby, Private 'Jam' Harris. Private Fosh most ably carried out duties of M.C."

**NOTES FROM DELHI.**—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant Director of Medical Services (British Service), writes as follows, dated January 21, 1914:—

"*Appointments.*—Major C. J. O'Gorman, D.S.O., has been appointed to command the Station Hospital, Barrackpore.

"*Extension of Tour of Indian Service.*—The following officer has been allowed to extend his tour of Indian service till trooping season 1914-15: Major M. Swabey.

"*Leave.*—General leave ex-India to the undermentioned officers has been concurred in:—

"Major A. C. Duffey, R.A.M.C., six months, from March 18, 1914, to September 17, 1914.

"Major W. S. Crothwait, six months, from December 12, 1913, to June 11, 1914 (on medical certificate).

"Major J. W. West, six months, from April 9, 1914, to October 8, 1914.

"Major F. W. Lambelle granted an extension of leave on medical certificate, from December 22, 1913, to June 21, 1914.

"Captain J. B. Jones, six months, from January, 1914 (date of departure), to July, 1914.

"Captain F. H. Bradley, six months, from January 1, 1914, to June 30, 1914.

"Captain G. F. Dawson, six months, from January 14, 1914, to July 13, 1914.

"The Director, Medical Services in India, has issued the following letter (No. 214/28 (D.M.S. 2), dated December 20, 1913), to General Officers Commanding Divisions and Aden Brigade:—

"I am directed to inform you that numerous instances have occurred in which officers of the Royal Army Medical Corps have failed to report themselves in writing to the War Office on arrival in England, and have similarly omitted to notify the War Office of their departure therefrom, as required by King's Regulations, paragraphs 1301, 1513 (v) (a) and (vi). I am therefore to request that the attention of all Royal Army Medical Corps officers be drawn to these paragraphs, and thus obviate unnecessary correspondence."

"*Appointments (Administrative Officers).*—Colonel C. E. Nichol, British Service, Assistant Director of Medical Services, Presidency Brigade, has been transferred to the Jubbulpore and Jhansi Brigades.

"Colonel R. Kirkpatrick, C.M.G., British Service, Assistant Director of Medical Services, Abbottabad and Sialkot Brigades, has been transferred to the Presidency Brigade, to be replaced by Colonel W. W. Pike, D.S.O., early in February."

### **SPECIAL RESERVE OF OFFICERS.**

#### **ROYAL ARMY MEDICAL CORPS.**

Supernumerary Captain William M. Browne is restored to the establishment, dated April 6, 1913.

The undermentioned Lieutenants are confirmed in their rank: William H. Johnston, William W. Wagstaffe, M.B., Ernest F. W. Grellier, Rowland B. Campion.

The undermentioned to be Lieutenants (on probation): George Albert Cole, late Cadet Colour-Serjeant, Durham University Contingent, Officers' Training Corps, dated December 14, 1913; Raymond John Clausen, M.B., late Cadet, University of London Contingent, Officers' Training Corps, dated January 9, 1914; Cadet Colour-Serjeant Joseph Walsh Park Harkness and Cadet Andrew Picken, from the Glasgow University Contingent, Officers' Training Corps, dated January 24, 1914; David Dempster, late

Serjeant, St. Andrews' University Contingent, Officers' Training Corps; Cadet Corporal Richard O'Kelly, from the Dublin University Contingent, Officers' Training Corps; Cadet Lance-Corporal Ewen Stewart Macphee and Cadet Thomas Young, from the Glasgow University Contingent, Officers' Training Corps, dated January 26, 1914; Cadet Andrew Cooper Cassells, from the St. Andrews' University Contingent, Officers' Training Corps, dated January 29, 1914; Cadet Clive Alan Whittingham, from the Glasgow University Contingent, Officers' Training Corps, dated January 31, 1914.

### **TERRITORIAL FORCE.**

#### **ROYAL ENGINEERS.**

*Wessex Divisional Engineers, Royal Engineers.*—Surgeon-Captain Edward G. Stocker to be Surgeon-Major, dated January 12, 1914.

#### **ROYAL ARMY MEDICAL CORPS.**

*1st South Western Mounted Brigade Field Ambulance.*—Transport Officer and Honorary Lieutenant William H. R. Alexander resigns his commission, dated February 4, 1914.

*3rd East Lancashire Field Ambulance.*—Supernumerary Lieutenant Kingsmill W. Jones, M.D., ceases to serve with No. 18 Field Ambulance, Special Reserve, and is restored to the establishment, dated February 4, 1914.

*2nd North Midland Field Ambulance.*—Captain Albert J. Riddett to be Major, dated February 7, 1914.

*1st Northern General Hospital.*—Captain William J. Phillips, M.B., resigns his commission, dated February 7, 1914.

*1st Western General Hospital.*—Captain Claude Rundle, M.D., to be Major, dated February 7, 1914.

*1st London Clearing Hospital.*—Cuthbert Hamilton Withers to be Quartermaster, with the honorary rank of Lieutenant, dated January 16, 1914.

*1st Highland Field Ambulance.*—Major Thomas Fraser, M.B., to be Lieutenant-Colonel, dated November 1, 1913.

*3rd Northumbrian Field Ambulance.*—James Maurice Foord, M.B., to be Lieutenant, dated December 9, 1913.

*1st West Riding Field Ambulance.*—Henry Norman Goode, M.B., F.R.C.S.Ed., to be Lieutenant, dated December 9, 1913.

*3rd West Riding Field Ambulance.*—Captain John W. Stokes to be Major, dated February 11, 1914.

*West Riding Clearing Hospital.*—Captain Francis Darlow, M.B., from the 1st West Riding Field Ambulance, to be Captain, dated February 11, 1914.

*2nd Highland Field Ambulance.*—Alastair Robertson Grant, M.B., to be Lieutenant, dated January 28, 1914.

*1st Home Counties Field Ambulance.*—Charles Killick, M.D., F.R.C.S., to be Lieutenant, dated February 21, 1914.

*2nd East Lancashire Field Ambulance.*—Captain William F. Munro, M.B., ceases to serve with No. 18 Field Ambulance, Royal Army Medical Corps, Special Reserve, and is restored to the establishment, dated February 21, 1914.

*2nd South Midland Field Ambulance.*—Major George W. Craig to be Lieutenant-Colonel, dated October 1, 1913.

*3rd Southern General Hospital.*—Philip Edward Homer Adams, M.B., F.R.C.S., to be Captain, whose services will be available on mobilization, dated January 1, 1914.

*1st Western General Hospital.*—Lieutenant-Colonel Nathan Raw, M.D., F.R.C.S.Ed., whose retirement was announced in the *London Gazette*, August 19, 1913, is granted permission to retain his rank and to wear the prescribed uniform.

#### **SANITARY SERVICE.**

Lieutenant John James Buchan, M.D., from the 3rd West Lancashire Field Ambulance, to be Captain, whose services will be available on mobilization, dated January 7, 1914.

Captain James W. Somerville, M.D., resigns his commission, dated February 18, 1914.

#### **OFFICERS ATTACHED TO OTHER UNITS.**

Lieutenant Henry F. S. Richards, M.D., to be Captain, dated December 15, 1913.

Captain Albert E. Vidler resigns his commission, dated February 4, 1914.

Lieutenant William F. Roach, M.D., resigns his commission, dated February 4, 1914.

Alexander Grant Vermont van Someren, M.B., to be Lieutenant, dated January 1, 1914.

Thomas Jones Mackie, M.B., to be Lieutenant, dated January 13, 1914.

John George Cooke, M.B., to be Lieutenant, dated January 2, 1914.

William John Phillips, M.B. (late Captain, 1st Northern General Hospital), to be Lieutenant, dated February 7, 1914.

Surgeon-Captain Edward Churchill Stack, F.R.C.S.I., from the 6th Battalion The Prince of Wales's (North Staffordshire Regiment), to be Captain, dated February 11, 1914.

Captain Arthur Roberts, F.R.C.S., to be Major, dated August 8, 1913.

Surgeon-Major James Soutter resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated February 14, 1914.

Lieutenant William L. Hodge resigns his commission, dated February 14, 1914.

Lieutenant John Goss resigns his commission, dated February 21, 1914.

#### SUPERNUMERARY FOR SERVICE WITH THE OFFICERS' TRAINING CORPS.

Lieutenant Andrew F. Dixon (serving with the Dublin University Contingent, Senior Division, Officers' Training Corps), resigns his commission, dated January 29, 1914.

#### UNATTACHED LIST FOR THE TERRITORIAL FORCE.

Captain Alexander Granville, Royal Army Medical Corps, resigns his commission, dated February 21, 1914.

#### QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

*Postings and Transfers.*—Sisters: Miss P. Steele, to South Africa, from Tidworth; Miss M. E. Harding, to South Africa, from Netley; Miss H. A. Hare, to South Africa, from Chatham; Miss M. Clements, to South Africa, from Aldershot; Miss J. W. Wilson, to Woolwich, from Netley; Miss M. O'C. McCreery, to Netley, from Woolwich; Miss M. Worthington, to Woolwich, from Netley; Miss D. D. Tripp, to Tidworth, from Woolwich; Miss W. Potter, to Dublin, from Edinburgh; Miss A. F. Byers, to Edinburgh, from London, as Acting Matron; Miss M. C. Johnston, to Aldershot, on return from South Africa; Miss D. M. C. Michell, to Egypt, from Dublin; Miss J. Murphy, to Egypt, from Devonport. Staff Nurses: Miss D. C. Isaacson, to Netley, from London; Miss A. L. Plimsaul, to Colchester, from Cosham; Miss E. A. Harvey, to York, from Aldershot; Miss G. L. Bentley, to Aldershot, from London; Miss A. D. M. Alban, to Aldershot, from London; Miss J. Findlater, to Aldershot, from Tidworth; Miss N. I. Jordan, to Tidworth, from Aldershot; Miss B. E. Smith, to Tidworth, from Aldershot.

*Arrivals.*—Miss M. C. Johnson, Sister, from South Africa.

*Examinations for Promotion.*—The undermentioned Sisters qualified at the recent examination held for rank of Matron: Miss A. B. Cameron, Miss J. Murphy, Miss D. M. C. Michell, Miss E. C. Fox, Miss E. M. Denne, Miss H. M. Drage.

## ROYAL ARMY MEDICAL COLLEGE.

### EXAMINATION OF CAPTAINS FOR PROMOTION TO MAJOR.

*Hygiene* (for Class).—(Written.) Wednesday, January 21, 1914. From 10 a.m. to 1 p.m.

(1) What do you understand as implied by the terms "pleum" and "vacuum" systems of ventilation? Describe in detail what you would consider suitable in the way of ventilation for a barrack room to be occupied by 12 men, specifying in particular (a) the dimensions of the room, (b) the amount of window space, and (c) the amount of floor space and wall space which you would allow for each bed.

(2) Describe the slow process of sand filtration of water and contrast it with mechanical filtration. How may sand filtration be carried out in the field?

(3) What points have to be considered specially when constructing a reserve ration for active service in a temperate climate?

(4) A brigade of which you are in medical charge is to occupy a bivouac for three days. Describe in detail what measures you would recommend for the disposal of refuse other than human excreta.

(5) In an outbreak of enteric fever which you have been investigating the evidence points to one man as being a possible "carrier." Describe in detail the bacteriological procedure you would adopt to confirm your suspicion.

*Hygiene* (for Class).—(Practical.) Thursday, January 22, 1914. From 10 a.m. to 1 p.m.

(1) Examine the water sample "A" for the presence of a poisonous metal, and in the same sample estimate the amount of—

(a) Nitric nitrogen (nitrates).

(b) Oxygen absorbed in fifteen minutes at 80° F.

Further analysis of the sample gives the following results:—

Total solids .. ..	95	parts per 100,000
Volatile solids .. ..	5	" "
Chlorine .. ..	9.5	" "
Free ammonia .. ..	0.01	" "
Albuminoid ammonia .. ..	0.002	" "
Nitrites .. ..	0.08	" "
Hardness, total .. ..	19.0	" "
" fixed .. ..	12.0	" "

Total number of micro-organisms growing in gelatine at 22° C. in three days 120 per c.c.

No lactose fermenters were found in 100 c.c. of the sample.

Discuss the results of the whole analysis and state if you consider the water fit for drinking purposes.

(The strength of the necessary standard solutions is given on the blackboard.)

(2) Estimate the acidity of the solution "B" and express the result in grammes of sulphuric acid ( $H_2SO_4$ ) per litre.

*Pathology* (for Class).—(Written Examination.) Wednesday, January 21, 1914. From 2.30 to 5.30 p.m.

(1) The following was the result of an examination of the blood of a patient who had recently been in the Tropics. Discuss the relative significance of the various points brought out and give your views as to the possible nature of the case.

(i) Red corpuscles .. .. 3,500,000 per c.mm.

(ii) Leucocytes .. .. 2,750 "

(iii) Colour index .. .. 0.6

(iv) Census of leucocytes—

Polynuclears .. ..	47 per cent
Hyalines .. ..	20 "
Lymphocytes .. ..	19 "
Eosinophiles .. ..	9 "
Transitionals .. ..	4 "
Mast Cells .. ..	1 "

(Three normoblasts were seen while 300 leucocytes were counted, and there was a certain amount of diffuse polychromatophilia of the red cells.)

(v) Parasites .. .. None seen.

(vi) Agglutination .. .. Negative to typhoid and undulant fever but positive to paratyphoid "B," up to a dilution of 1:40.

(vii) Blood culture .. .. Negative.

(2) Describe the cultural and morphological characters of the *Micrococcus melitensis*. Give in detail the means which you would employ to establish a diagnosis in a case of suspected undulant fever.

(3) Describe and contrast the *Bacillus lepra* and the *Bacillus tuberculosis*, (a) from the morphological and cultural points of view, (b) from the histological characters of the lesions to which they give rise, respectively.

(4) Give an account of the characters of the *Trypanosoma gambiense* and of the pathogenic effects produced by it. State also what is known with regard to the means by which infection is carried.

*Pathology* (for Class).—(Practical Examination.) Friday, January 23, 1914. From 10 a.m. to 1 p.m.

(1) Examine carefully the bacterial mixture contained in the tube marked with your examination number, and write a concise account of what you find. Leave two stained films, one of them a "Gram," beside your microscope.

(2) Examine and report upon the pathological material marked "A," "B," or "C," leaving your stained films for examination.

(3) Mount and stain the section with which you are provided so as to demonstrate the presence of Gram-positive micro-organisms, and leave it in focus under your oil-immersion lens.

(4) Oral examination.

#### EXAMINATION FOR COMMISSION IN THE ROYAL ARMY MEDICAL CORPS.

*Medicine*.—Case for Commentary. Wednesday, January 28, 1914. Commencing 10 a.m. Time allowed, 1½ hours. Read your instructions.

A young man, aged 24, a clerk in an office, was taken ill on or about November 2, with headache, fever and shortness of breath.

The history was that he had some dyspepsia, and had felt run down the previous September; he went for a holiday and returned feeling much better in the middle of October.

His condition on November 2 was as follows: A tall, spare man, looking ill, temperature, 102.4° F.; pulse, 100; respiration, 28. His face was flushed, the skin moist, he felt chilly, but had had no rigor. His tongue was coated, the appetite bad, and he complained of much headache, frontal and post-orbital.

Physical examination: the muscles were soft and flabby, the chest was well-formed, the movements equal, percussion normal over the front; slight impairment of note at the right supra-spinous fossa, and mid-scapular region; the inspiration was exaggerated over the whole chest; there was no bronchophony, and no adventitious sounds were heard. He had an irritable cough, but no expectoration.

The heart's apex beat and precordial dullness were normal, there was slight blurring of the first sound at the apex, the sounds at the base were normal. The abdomen was soft, rather tumid, not tender, and there were no rose spots; the liver and spleen could not be felt; the bowels were constipated, there was no blood in the stools; the urine, sp. gr. 1024 acid, a faint trace of albumen, no sugar, deposit of lithates. Twelve days later his general condition was the same, but the cough was very troublesome and he was distinctly cyanosed, and the respirations were 32–36; the temperature ranged between 100° F. and 102.8° F., his pulse about 120, and he perspired freely; a Widal reaction on the eleventh day of his illness was negative, a blood examination showed some reduction in the number of red cells, but there was no leucocytosis. There was no increase in the physical signs at the apex of the right lung, but a few scattered rhonchi and moist sounds could be heard at the bases of the lungs. The heart sounds were as before.

From November 15 onwards his headache increased, and he lost much weight and strength, otherwise the physical signs had not altered. On December 3 he vomited, and was unable to speak and wandered; he was then found to be hemiplegic on the right side, face, arm and leg. His temperature fell to 99.4° F. and his pulse was 112. There was no squint or optic neuritis. He soon afterwards became somnolent and had incontinence; he declined all nourishment and, becoming unconscious, died on December 6.

Discuss the differential diagnosis in the early and later stages of the illness. What morbid changes would you expect to find at the *post-mortem* examination?

*Surgery*.—Case for Commentary. Wednesday, January 28, 1914. Commencing 11.40 a.m. Time allowed, 1½ hours. Read your instructions.

A man, aged 30, was admitted to hospital stating he had had four fits in the preceding three months.

These fits occurred when he was taking his meals. No aura preceded the fits and there was no memory of it after its occurrence. There was complete unconsciousness during the fit, but there was no sleep nor headache after it.

He did not suffer from vomiting, headache, pupillary changes or optic neuritis.

At the age of 4 he was stabbed with a pitchfork over the right temporal bone in its squamous portion. A small scalp scar is now visible, which is not tender, and there is no indent in the bone.

He was confined to bed for several months after this head injury, with hemiplegia involving the face, arm and leg of the left side. In a few months the leg recovered power in every respect (motor, sensory and trophic) and is now as good as the right leg. There is neither clonus nor variation in the knee jerks.

The left arm is in a condition of spastic paralysis with wrist drop and marked atrophy of the fore-arm and hand muscles, the fingers are rigid and semi-flexed, but capable of slight movements. The face is paretic on the left side, but the eyelids can be tightly closed on extra effort.

His friends say there is twitching of the muscles of the left side over the jaw, neck, and fore-arm at the beginning of the fit.

Discuss the case as to the conditions underlying the symptoms. What treatment would you suggest and what prognosis would you give?

## ROYAL ARMY MEDICAL CORPS.

An examination for not less than twelve commissions in the Royal Army Medical Corps will be held on July 29, 1914.

Applications to compete should be made to the Secretary, War Office, not later than July 20, 1914.

The presence of candidates will be required in London from July 27, 1914.

*War Office, February, 1914.*

## UNITED SERVICES MEDICAL SOCIETY.

The next meeting of the Society will be held at the Royal Army Medical College, Grosvenor Road, on Thursday, March 12, 1914, at 5 p.m. Business: "Some experiences of the Balkan Wars," Major E. T. F. Birrell, R.A.M.C.

G. A. D. HARVEY, *Captain R.A.M.C.*

E. C. STANFORD, *Staff-Surgeon R.N.*

*Hon. Secretaries.*

## ROYAL ARMY MEDICAL CORPS CENTRAL MESS FUND.

TO THE EDITOR OF "THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—There is reason to believe that the idea still exists amongst a number of officers of our Corps that the Central Mess Fund is drawn upon to pay for the entertaining of guests at the Headquarter Mess in London. This is not the case. Since its inception no part of this Fund has been expended on entertainments in London or elsewhere. On the contrary, the considerable expense connected with entertaining the delegates to the recent International Medical Congress was borne entirely by the members of the London Mess. Officers wishing to know how the Central Mess Fund is expended will find full reports in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, which are promulgated after every meeting of the Committee of that Fund.

I am, &c.,

S. GUISE MOORES,  
*Lieutenant-Colonel.*

*Aldershot,  
February 20, 1914.*



## ROYAL ARMY MEDICAL CORPS CENTRAL MESS AND GAMES COMMITTEE.

PROCEEDINGS OF A MEETING OF THE COMMITTEE HELD ON FEBRUARY 9, 1914.

*Present.*

Lieutenant-Colonel S. Guise Moores, in the Chair.

Major J. R. McMunn, Netley.

Major A. L. A. Webb, Scottish Command.

Major H. B. Fawcus, London.

Major C. D. Myles, Western Command.

Major A. B. Smallman, Aldershot.

Captain S. M. W. Meadows, Salisbury Plain.

Captain G. A. D. Harvey, London.

Captain W. Benson, Rawal Pindi.

Letters regretting their inability to attend were submitted from Lieutenant-Colonel Jameson, Woolwich; Majors Moore, Chatham; Clements, Cork; Adye-Curran, Portsmouth; Fielding, Plymouth; Burke, Dover; Smith, Belfast; Captains Edmunds, Peshawar; Kelly, Dublin; and Ferguson, Northern Command.

(1) The minutes of the previous meeting were read and confirmed.

(2) The Hon. Secretary read letters stating that the Cairo mess had been closed; that Major Clements would represent the Cork district in place of Major Martin, transferred; that the officers R.A.M.C. Chatham district desired that Major Moore, though transferred to another Command, should continue to represent them for the present; and that Captain Mathieson had left for South Africa.

The subscribers to the Fund, to the present date, were reported to number 727; 105 promised subscriptions had not yet been paid; 70 officers had declined to subscribe; and from 100 no reply had been received. It is hoped that there will be many new subscribers from March 1 next, upon which date the annual subscription for 1914-15 falls due.

(3) A grant to the Curragh mess for cutlery was sanctioned, the amount to be settled by the Sub-committee on receipt of estimate. The consideration of the other requirements of this mess was postponed, pending the receipt of detailed estimates.

(4) The recommendation of the Sub-committee that a grant of £80 be made to the Netley mess was approved. Detailed estimates were examined, and vouchers which showed that during the years 1911-13 £160 had been expended out of the furniture fund. It was evident that, from the special circumstances of the case, the upkeep of this mess in a manner creditable to the Corps falls very heavily on the small number of existing members.

(5) The receipt of £76 12s. 6d., the credit balance of the late R.A.M.C. mess at Tempe, was reported, and the Hon. Secretary was directed to express to the late members of that mess the warm thanks of the Committee and its grateful appreciation of their generous gift, which created an important precedent. It was decided that the articles of plate previously received from the Tempe mess be distributed among the Curragh, Woolwich and Peshawar messes, in accordance with the wishes for various articles expressed in reply to the circular sent.

(6) A letter was read from Peshawar thanking the Committee for the grant of £50 to that mess towards making good its losses, and stating that the whole contents of the mess are now fully insured.

(7) The Sub-committee reported that it had considered the matter of the Rawal Pindi debentures, upon which Captain Benson had submitted a report. It appeared that the heavy charge on that mess was not so much for payment of interest as for repayment of principal. The Sub-committee considered that it was a question for further careful consideration whether a proportion of the debentures should not be taken over by the Central Fund at a lower rate of interest than the existing one, whereby the mess would be relieved of expense and the Corps would become part owners of a valuable property. Captain Benson had therefore been asked to write to Rawal Pindi for further details.

(8) It was resolved that the recommendations of the Committee to the Annual General Meeting in June next be published in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS; and that the Sub-committee be empowered to frame detailed proposals on the principles already agreed upon, should this publication be desirable before the next meeting of the General Committee.

It seemed desirable to consider whether, if found practicable, a uniform rate of joining contributions to the various messes at home and abroad should not be adopted. Such contributions to be paid by the Central Mess Fund.

(9) Details were submitted as to the requirements of the training camp at the Curragh for mess equipment. It was resolved that a loan of £70, free from interest, repayable by seven annual instalments of £10, be offered for this purpose, subject to a suitable guarantee of repayment being received, and on the understanding that subscribers to the Central Fund contribute at a lower rate to the expenses of such mess than do non-subscribers. (This offer has since been accepted.)

Major Webb was asked to submit further details of the requirements of the camp of instruction in the Scottish Command at a subsequent meeting.

(10) It was resolved that the payment, or part payment, of their railway fares to members of the Committee be recommended to the Annual General Meeting, and that the Honorary Secretary collect data for an estimate of such expenses.

(11) The question of the formation of a Corps Rowing Club was considered. This was referred to the Central Games Committee after the half-yearly General Meeting of members of the London mess, as the project was found to involve greater expenditure than that mess felt prepared to make. The Honorary Secretary was directed to reply that, though the Committee of the Central Mess Fund had been instructed at the Annual General Meeting, 1912, to look after the interests of the Corps in games and sports, with special reference to inter-regimental competitions, it was not authorized to expend any part of the Fund on such objects.

(12) The Honorary Secretary reported that the Army Golf Meeting will be held this year in Scotland, during October. There will be a spring meeting at Woking of which further notice will be given.

## NOTES ON GAMES AND SPORT.

*Association Football.*—Serjeant-Major Drury, R.A.M.C., Hon. Secretary R.A.M.C. Football Club, writes: "Football is still going strong at Aldershot. Since the last notes the following matches have been played: On January 31 we met the 2nd Battalion South Staffordshire Regiment in the 2nd round Aldershot Senior Cup, winning by 3 goals to 2, after extra time. We had several of our players injured in this match, so were not able to put a full team in the field on the 3rd inst., when a game in the Aldershot Senior League, against the Royal Munster Fusiliers, was played; we just managed to win by 2 goals to 1. On the 7th inst. we met the 30th Brigade, Royal Field Artillery, in the 4th round Army Cup, on our own ground, and after a very bustling game in the rain the Corps team were victorious by 2 goals to 1. On the 14th inst. we had a very stubborn fight with Bromley in the 3rd round Amateur Cup Competition, making a draw 2 goals each. The Referee did not play extra time, as he should have done, so we protested that the game should be replayed at Aldershot; this protest we won, so everyone is looking forward to a keen contest on Saturday next.

"This match was replayed at Aldershot on February 21, the Corps being victorious in a keen and well-contested game, by 6 goals to 1.

"Four of our players, Corporal Prince, Privates Gillham, Morris and Southall, were selected for the Army Team on the 11th inst., when Mr. Vivian Woodward brought his crack eleven to Aldershot. Our men fully justified their selection, all playing an exceptionally good game.

"The boys' team have played four more matches, winning all four. Their opponents were Aldershot Shop Assistants, 3 to 0; 1st Northamptonshire Regiment, 4 to 0; 1st Coldstream Guards, 8 to 0; 1st Loyal North Lancs., 2 to 1. This last game was almost as depressing as a loss, because to have a goal scored against the boys was unheard of (this season) until then, their record being 105 for 1 against.

"The final of the Harwood Cup Competition was decided at Burtons Court, Chelsea, on the 18th inst. when No. 35 Company met No. 1 Company (the holders), and after a well-contested game No. 1 Company came out victorious by 3 goals to none.

"After the match Colonel J. G. Harwood (the donor) presented the Cup and medals to the winning team and medals to the runners up. In congratulating the winners he stated that it was the first final he had witnessed in the competition, and he sincerely hoped that the Corps team would go through with the Army and Amateur Cup Competitions.

"Lieutenant-Colonel G. H. Barefoot, officer commanding No. 35 Company, expressed his thanks to Colonel J. G. Harwood for attending the match and his kindness in presenting the Cup.

"Three cheers being heartily given for Colonel Harwood, Serjeant-Major R. Cox called for three cheers for the winners, Serjeant-Major C. A. Figg for three rousers for No. 35 Company.

"Twelve companies entered the competition, i.e., Nos. 1, 2, 3, "A," "B," "C" Depot, No. 4 Netley, No. 6 Cosham, No. 11 Shorncliffe, No. 12 Woolwich, No. 20 Tidworth, and No. 35 London; the first and last companies in the Corps meeting in the Final."

*Rugby Football.*—Lieutenant J. L. Huggan has been playing regularly for the Army. Lieutenant H. C. D. Rankin played against the United Hospitals and against Cambridge.

*Rowing.*—Reference to a proposed Corps Rowing Club will be found under proceedings of Committee above.

*Miscellaneous.*—We hear from Gibraltar that Lieutenant-Colonel S. G. Allen has been appointed a steward of the Gibraltar Jockey Club, and Major J. Tobin official starter. The latter has also been appointed Assistant Field Master of the Royal Calpe Hunt.

3, Homefield Road,  
Wimbledon Common, S. W.

J. T. CLAPHAM, *Captain,*  
*Hon. Secretary.*

## ROLL OF THE OFFICERS OF THE MEDICAL SERVICE OF THE ARMY, FROM THE ACCESSION OF GEORGE II, IN 1727, TO THE FORMATION OF THE ROYAL ARMY MEDICAL CORPS IN 1898.

THIS work, on which Colonel William Johnston has been engaged for several years, is now in an advanced stage of preparation. It has been suggested that it would be interesting to note as far as possible relationships existing between officers who served during that period and naval or military officers who served either before, during, or after that time. He would therefore be much obliged if cases were pointed out to him where an officer's grandfather, father, son or brother has served or is serving in any branch of the Navy, Army, or Honourable East India Company's service.

He will also be glad to hear from any officers who are in possession of interesting items of information which it may seem likely are not within Colonel Johnston's knowledge. He would be glad also if any who have in their possession the *Commissions* or *Warrants* of medical officers who served as Hospital Assistants, or as Hospital or Regimental Surgeon's Mates, would communicate with him.

Communications addressed to Colonel Johnston, C.B., Newton Dee, Murtle, Aberdeenshire, will be welcomed and at once acknowledged.

February 20, 1914.

## OBITUARY.

### LIEUTENANT-COLONEL ROBERT DOVETON HODSON.

LIEUTENANT-COLONEL R. D. HODSON died at Bournemouth on January 30, 1914, aged 59. He was the son of Captain Benjamin Hodson, Madras Army, and was born at Bathwick, Somerset. He became a member of the Royal College of Surgeons, England, in 1876, and obtained the Licence of the Royal College of Physicians, Edinburgh, in the same year. In 1877 he joined the Service as a Surgeon, Army Medical Department. He served abroad in India, Nova Scotia, South Africa, and Ceylon. He was promoted Surgeon-Major in 1889, Surgeon Lieutenant-Colonel in

1897, and was selected for increased pay in 1900. In 1910 he was placed on retired pay and shortly afterwards assumed charge of the Military Hospital, Trowbridge. His war service was: Afghan War, 1878-80; Occupation of Kandahar, medal. South African War, 1899-1900; Operations in Cape Colony, south of Orange River, Queen's medal with clasp.

#### CAPTAIN PERCY FARRANT.

CAPTAIN P. FARRANT died at Sierra Leone on February 10, 1914, aged 31. He was born at Taunton in 1882. He received his medical education at Westminster Hospital and became a member of the Royal College of Surgeons and a Licentiate of the Royal College of Physicians, London, in 1905. He was an Assistant House Surgeon, and later a House Surgeon of the Westminster Hospital. In 1905 he joined the Service as a Lieutenant, Royal Army Medical Corps, and in 1907 proceeded on foreign service to Jamaica. He returned home in 1909 and was promoted Captain in the same year. In February, 1913, he went to West Africa and after one year's service on the coast died at Sierra Leone.

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#### MARRIAGE.

O'RORKE—COLOMB.—On January 31, at Dacca, India, Charles O'Rorke, Captain R.A.M.C., to Eileen, only daughter of Colonel Colomb, 10th Gurkhas.

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#### DEATHS.

HODSON.—At Bournemouth, on January 30, Lieutenant-Colonel Robert Doveton Hodson, retired pay, late Royal Army Medical Corps, aged 59.

FARRANT.—At Sierra Leone, on February 10, Captain Percy Farrant, R.A.M.C., aged 31.

SLAUGHTER.—At the Queen Alexandra Military Hospital, London, on February 14, Maurice Aldous Slaughter, aged 19, Second Lieutenant K.O.S.B.'s (S.R.), youngest son of Surgeon-General W. B. Slaughter (retired).

## EXCHANGES, &c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

Major, with two years to do in India, wishes to exchange for three years or more at home. Good bonus offered. Apply, Major McCarthy, Mallow, Whitwell Road, Southsea.

Major, due for foreign service next Trooping Season, wishes to exchange with an officer low down on roster. Apply, "Aeroplane," c/o Messrs. Holt and Co., Whitehall, London.

Major, probably due for abroad latter part of Trooping Season, 1915-16, wishes an exchange to the Mediterranean to complete a tour. Apply "Shughl," c/o Sir C. R. McGrigor, Bart., & Co., 25, Charles Street, London, S.W.

Major, due for foreign service next Trooping Season, wishes to exchange with an officer low down on the foreign roster. Apply, "M.L.M.," c/o Sir C. R. McGrigor, Bart., & Co., 25, Charles Street, St. James, London.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

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	8	0	6 9	0 3 2				
	16	0	12 0	0 5 3				
100	4	0	5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0	9 0	0 4 4				
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## Notices.

### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

**All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.**

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Major G. T. K. Maurice, Major A. J. Chambers, Major S. G. Butler, Captain Colin Clarke, Colonel C. Birt, Captain A. W. Byrne, Captain P. S. Tomlinson, Lieutenant-Colonel S. F. Clark, Captain E. M. Middleton, Captain A. C. Amy, Mr. C. Gardine, Captain H. A. Emerson, Captain C. R. Sylvester Bradley, Colonel F. Smith, Lieutenant-Colonel S. G. Allen, Colonel Firth, Major R. C. Wilson, Colonel C. H. Melville, Major H. Ensor, Major W. F. Foulds, Captain K. H. Reed.

The following publications have been received:—

*British: The Army and Navy Gazette, The Lancet, The Indian Medical Gazette, Transactions of the Society of Tropical Medicine and Hygiene, The St. Thomas's Hospital Gazette, Medical Press and Circular, The Army Service Corps Journal, The Hospital, The Royal Engineers' Journal, Guy's Hospital Gazette, The Practitioner, Public Health, Journal of the United Service Institution of India, The Australasian Medical Gazette, The Medical Review, The Middlesex Hospital Journal, Red Cross and Ambulance News, Proceedings of the Royal Society of Medicine, Tropical Diseases Bulletin, The Journal of Tropical Medicine and Hygiene, Journal of S. and T. Corps, Indian Army, Agricultural Research Institute, Bulletin No. 36, The Indian Journal of Medical Research, Proceedings of the Third All-India Sanitary Conference, Journal of Vaccine Therapy, Indian Medical Journal, The Clinical Report of the General Lying-in Hospital, The Journal of Practical Dietetics and Bacterio-Therapeutics.*

*Foreign: Office International d'Hygiène Publique, Le Caducée, Archives de Médecine et de Pharmacie Navales, Archives de Médecine et de Pharmacie Militaires, Archiv für Schiffs- und Tropen-Hygiene, Tidskrift I Militär Hälsovård, Annales d'Hygiène et de Médecine Coloniales, Russian Medical Journal, Schmidt's Jahrbücher, Revista de Sanidad Militar, Russian Naval Medical Journal, The Journal of Infectious Diseases, Bulletin de la Société de Pathologie Exotique, Archives de l'Institut Pasteur de Tunis, Deutsche Militärärztliche Zeitschrift, Annali di Medicina Navale e Coloniale, United States Public Health Service, Bulletin de l'Institut Pasteur, United States Naval Medical Bulletin, The Military Surgeon, Militärlagen, Giornale di Medicina Militare, American Medicine, Bulletin of the Johns Hopkins Hospital, Memorias Do Instituto Oswaldo Cruz.*

## MANAGER'S NOTICES.

The **JOURNAL OF THE ROYAL ARMY MEDICAL CORPS** is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,  
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"  
WAR OFFICE, WHITEHALL, S.W.

# JOURNAL

OF THE

## ROYAL ARMY MEDICAL CORPS.

### Corps News.

APRIL, 1914.

#### ESTABLISHMENTS.

School of Army Sanitation: Major Harold B. Fawcus, M.B., Royal Army Medical Corps, from an Assistant Professor at the Royal Army Medical College, to be Instructor, *vice* Major C. E. P. Fowler, F.R.C.S., dated March 1, 1914.

Royal Army Medical College: Major Percy S. Lelean, F.R.C.S., Royal Army Medical Corps, to be an Assistant Professor, *vice* Major H. B. Fawcus, M.B., dated March 1, 1914.

#### ARMY MEDICAL SERVICE.

Surgeon-General George W. Robinson, C.B., is placed on retired pay, dated March 22, 1914.

Colonel William G. Macpherson, C.M.G., M.B., K.H.P., to be Deputy Director-General, and to be granted the temporary rank of Surgeon-General whilst so employed, *vice* Surgeon-General W. Babbie, V.C., C.B., C.M.G., M.B., dated March 6, 1914.

Colonel Robert W. Ford, D.S.O., from the half-pay list, is restored to the establishment, *vice* Colonel W. G. Macpherson, C.M.G., M.B., K.H.P., appointed Deputy Director-General, dated March 6, 1914.

Colonel Edward Butt, from the half-pay list, is placed on retired pay, dated March 4, 1914.

#### ROYAL ARMY MEDICAL CORPS.

The undermentioned Captains to be Majors, dated March 1, 1914:—

Brevet-Major Arthur B. Smallman, M.D., Wentworth F. Tyndale, C.M.G., M.D., William F. Ellis, Ralph B. Ainsworth, Charles A. J. A. Balck, M.B., Dudley S. Skelton, Philip G. Easton, Richard Rutherford, M.B.

Captain Francis M. M. Ommanney retires with a gratuity, dated March 11, 1914.

**HIGHER RATE OF PAY.**—Lieutenant-Colonel R. J. Windle has been selected for the increased pay under Article 358, Royal Warrant for Pay and Promotion.

**ARRIVALS HOME FOR DUTY.**—From Jamaica: on March 2, Major H. P. W. Barrow, Captain S. Field. From India: on March 5, Majors J. G. Gill, G. J. A. Ormsby, H. M. Nicholls, Captains O. R. McEwen, A. G. Wells; on March 10, Lieutenant-Colonel J. C. Connor, Majors A. G. Thompson, E. T. Inkson, V.C., Captains W. F. M. Loughnan, M. O. Wilson. From West Africa: on March 14, Majors W. J. Taylor, G. J. Houghton and T. B. Unwin. From Bermuda: on March 19, Lieutenant-Colonel R. H. Hall.

**ARRIVALS HOME ON LEAVE.**—Major R. B. Black, Captains W. A. Spong and J. D. Bowie.

**POSTINGS.**—Scottish Command: Major H. M. Nicholls, Captain A. G. Wells. Aldershot Command: Major M. H. G. Fell. Eastern Command: Majors A. E. Hamerton, D.S.O., Captains W. F. M. Loughnan, M. O. Wilson. Southern Command: Lieutenant-Colonel R. H. Hall, Majors A. G. Thompson, E. T. Inkson, V.C., J. G. Gill, Captains R. J. C. Thompson and M. Leckie. Irish Command: Lieutenant-Colonel J. C. Connor, Major G. J. A. Ormsby, Captains J. T. McEntire, S. Field, O. R. McEwen. London District: Majors J. C. B. Statham (temporarily, pending embarkation for West Africa) and H. P. W. Barrow.

Major W. L. Baker has been posted to the London District instead of to the Eastern Command, as previously notified.

**TRANSFERS.**—To London: Brevet-Colonel S. Hickson, K.H.S., from Aldershot. To Chatham: Lieutenant-Colonel C. A. Young, from Shrewsbury. To Warley: Lieutenant-Colonel S. G. Moores, from Aldershot. To the Royal Military College: Major F. E. Gunter, from Tidworth. To Aldershot: Major J. F. Martin, from the Royal Military College. To the Eastern Command: Major A. H. Safford, from Dublin.

**APPOINTMENTS.**—Surgeon-General W. Babbie, V.C., C.B., C.M.G., Director of Medical Services in India. Lieutenant-Colonel M. P. C. Holt, D.S.O., charge of the Cambridge Hospital, Aldershot. Lieutenant-Colonel S. G. Moores, charge of the Military Hospital, Warley. Major F. E. Gunter, Assistant Surgeon, Royal Military College. Major M. H. G. Fell, D.A.D.M.S., Aldershot Command. Major W. L. Baker, a Medical Examiner of Recruits, London Recruiting Area. Captain W. C. Nimmo, Medical Charge of Military Families, Wellington Lines, Aldershot (Specialist in Midwifery and Gynæcology).

**RETIRED PAY APPOINTMENTS.**—Colonel E. Butt, D.A.D.M.S., 2nd London Division, Territorial Force. Lieutenant-Colonel W. Turner, D.A.D.M.S., Welsh Division, Territorial Force.

The following retired pay appointments are vacant: Berehaven, Fort Efford and Mutley District, Golden Hill Fort, Netheravon, and Wrexham.

**QUALIFICATION.**—Captain W. J. E. Bell has obtained the Diploma in Public Health of the Royal Colleges of Physicians, London, and Surgeons, England.

**EMBARKATION.**—For India: on March 6, Surgeon-General W. Babbie, V.C., C.B., C.M.G.

**RESULTS OF EXAMINATIONS.**—The following results of examinations are notified for general information:—

Passed for promotion to the rank of Lieutenant-Colonel:—

In Appendix xiv, K.R., Part 2: Majors J. P. Silver, H. W. Grattan, J. V. Forrest, P. MacKessack, E. T. Inkson, V.C., and R. S. H. Fuhr, D.S.O.

In Appendix xi, K.R., Subheads (d) ii and (d) iii: Major W. L. Baker.

In Appendix xi, K.R., Subhead (d) ii: Major A. E. Weld.

In Appendix xi, K.R., Subhead (d) iii: Major J. Tobin.

Passed for promotion to the rank of Major:—

In Appendix xi, K.R., Subhead (b): Captains G. H. J. Brown, G. W. G. Hughes, and G. F. Rugg.

In Appendix xi, K.R., Subheads (d) ii and (d) iii: Captains R. R. Lewis and A. R. Wright.

In Appendix xi, K.R., Subhead (d) iii: Captain T. E. Harty.

Passed for promotion to the rank of Captain:—

In Appendix xi, K.R., Subhead (c) ii: Lieutenants P. Hayes, W. B. Laird, H. S. Blackmore, F. R. B. Skrimshire, and C. J. H. Little.

#### **LIST OF CAPTAINS TO JOIN THE ROYAL ARMY MEDICAL COLLEGE, ON OR ABOUT OCTOBER 31, 1914.**

Thomson, D. S. B.  
Anderson, R. G.  
Lucas, T. C.  
Byam, W.  
Thompson, C. P.  
Heron, G. W.  
Kelly, C.  
Edmunds, C. T.  
Fraser, A. E. G.  
Pollard, A. M.  
Purdon, W. B.  
Rudkin, G. F.  
Cooke, O. C. P.  
Langrishe, J. du P.  
Thompson, W. I.  
Bennett, J. A.  
Bradish, F. L.  
Bracken, G. P. A.  
Johnson, B.  
McEntire, J. T.

Wood, J. L.  
Ryles, C.  
O'Brien-Butler, C. P.  
O'Keeffe, J. J.  
Browne, T. W.  
Benett, A. M.  
Ritchie, M. B. H.  
Howlett, A. W.  
Lochrin, M. J.  
Middleton, E. M.  
Scott, T. H.  
Tate, R. G. H.  
Thompson, R. J. C.  
Worthington, F.  
Boule, C. W.  
Elliott, A. C.  
Marshall, W. E.  
Lunn, W. E. C.  
Mitchell, W.  
O'Grady, D. de C.

McNeill, A. N. R.  
Vaughan, E. V.  
Amy, A. C.  
Caddell, E. D.  
Fairbairn, J.  
Lathbury, F. B.  
Poster, J. R.  
O'Connor, R. D.  
Casement, F.  
Turner, F. T.

*Waiting.*

Stewart, P. S.  
Heslop, A. H.  
Leckie, M.  
Beaman, W. K.  
Field, S.  
McEwen, O. R.

**WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.  
PROMOTIONS.**

SERJEANT-MAJOR.					
11225	Qmr.-Serjt.	Bennett, A.	..	18.2.14	Vice J. Woollard, to H.M. Commission.
11410	„	Conolly, W.	..	18.2.14	„ E. E. Ward, to H.M. Commission.

APPOINTED BUGLER.					
6943	Boy	..	Gilmour, A. W. J...	16.2.14	Vice A. G. Lever to the ranks.

**THE FOLLOWING N.C.Os. AND MEN HAVE PASSED THE NECESSARY  
CORPS EXAMINATIONS FOR PROMOTION.**

FOR QUARTERMASTER-SERJEANT.					
10166	S.-Serjt.	..	Loft, E. R.		
FOR STAFF-SERJEANT.					
12280	Serjeant	Endacott, A.	14082	Serjeant	Prince, G.
12264	„	Delamare, W. G.	14359	„	Thomas, J. G.
18110	„	Gibson, R. W.	17450	„	Elsey, W. J.
13661	„	Le Page, P. J.	12461	„	Cook, P. F.
17244	„	McArthur, A. F.	15698	„	Collier, H. C. F.
17091	„	Moore, J.			
FOR SERJEANT.					
12775	Lce.-Serjt.	Prett, H. C.	11566	Lce.-Serjt.	Brown, M. T.
12402	Corporal	..	18340	Corporal	..
18675	„	..	16762	„	Price, F.
17834	Lce.-Serjt.	Harman, F.			
FOR CORPORAL.					
706	Private	..	5108	Private	..
5202	„	..	1644	„	..
4724	„	..	4682	„	..
4945	„	..	5517	„	..
5544	„	..	6756	„	..
7049	„	..	7055	„	..
7266	„	..	992	„	..
5390	„	..			

**THE FOLLOWING N.C.Os. AND MEN HAVE QUALIFIED AS  
DISPENSERS OF MEDICINES.**

14850	Corporal	..	Mayman, T. G.	18929	Corporal	..	Taylor, J. W.
15022	„	..	Woodward, F.	18383	„	..	Hutchings, W.
18061	„	..	Cairns, W.	15183	„	..	Dewhurst, C.
1970	Private	..	Brunt, W. J. G.	17728	„	..	Hynes, T.
19030	Corporal	..	Mann, R. S.	18251	Lce.-Corpl.	..	Ovenden, E. E.
1785	Private	..	Phillips, W. J.	196	Private	..	Kent, A. J.
17501	Corporal	..	Christie, J.	5648	„	..	Smith, E. F.
19997	Lce.-Corpl.	..	Tilby, R. J.	19742	Lce.-Corpl.	..	Cannon, F. G.
6062	Private	..	Kirk, A. E.	6231	Private	..	Martin, P. J.
6313	„	..	Smith, H. G.	1112	„	..	Sheehan, J.

## TRANSFERS FROM OTHER CORPS.

7609	Private ..	Gillingham, H.	19.2.14	From 12th Lancers.
7610	„ ..	Molden, J.	19.2.14	„ 2nd Bn. Manchester Regt.
7611	„ ..	Kerry, W.	15.1.14	„ 1st Bn. L. N. Lancs. Rgt.
7612	„ ..	Lauraine, G.	25.2.14	„ R.F. Corps (M.W.)

## TRANSFERS TO ARMY RESERVE.

5305	Pte.	Killoran, M. ..	7.2.14	5343	Pte.	Crouch, S. ..	7.3.14
2181	„	Catling, E. J. ..	13.2.14	5346	„	Sumner, E. A. ..	26.2.14
5311	„	Fitzharris, G. ..	13.2.14	5344	„	Busson, T. ..	7.3.14
5308	„	Phillips, H. J. A. ..	13.2.14	5333	„	Farley, W. H. ..	1.3.14
5312	„	Slater, R. G. ..	14.2.14	5340	„	Tait, D. W. ..	2.3.14
5315	„	Stone, C. ..	15.2.14	5349	„	Cronin, T. F. ..	2.3.14
5314	„	Homer, W. A. ..	12.2.14	5339	„	Godfrey, W. K. ..	5.3.14
5323	„	Bailey, R. ..	19.2.14	5359	„	Davies, E. J. ..	10.3.14
5324	„	Wayman, H. ..	21.2.14	5342	„	Mason, A. ..	5.3.14
5327	„	White, L. ..	24.2.14	5356	„	Short, J. ..	5.3.14
5326	„	Smith, W. ..	24.2.14	5361	„	Orr, R. ..	5.3.14
5331	„	Shears, J. T. ..	26.2.14	5366	„	Moore, J. ..	10.3.14
6576	„	Sanderson, W. I. ..	26.2.14	5371	„	Dunne, D. ..	9.3.14
5328	„	Maydon, F. ..	26.2.14				

## EMBARKATIONS FOR ABROAD.

TO GIBRALTAR, PER P. AND O. "ARABIA," FEBRUARY 27, 1914.

17825 | Lce.-Serjt. | Moore, N.

## DISEMBARKATIONS FROM ABROAD.

FROM EGYPT, PER H.T. "SOUDAN," FEBRUARY 19, 1914.

15591	Serjeant ..	Harris, J.	12779	Serjeant ..	Stubbs, C.
18984	„ ..	Moore, E.	13086	Corporal ..	Flood, S.
264	Lce.-Corpl.	Trout, A.	109	Lce.-Corpl.	Emment, A. G.
17400	Private ..	Sarsfield, P.	10941	Private ..	Moody, T.
4810	„ ..	Wilkins, J.	943	„ ..	Ball, A. H.
1486	„ ..	Bullen, F.	501	„ ..	Benson, O.
1216	„ ..	Dunne, J.	954	„ ..	Hallett, H. C.
1098	„ ..	Wright, G. M.	257	„ ..	Coles, R. J.
4743	„ ..	Jeeves, T.	1410	„ ..	Pratt, J. R.
11319	„ ..	Smith, A. A.	1268	„ ..	Gray, J.
6491	„ ..	Jones, H.	1060	„ ..	Burrell, A. J.

FROM MALTA, PER H.T. "SOUDAN," FEBRUARY 19, 1914.

8269	Qmr.-Serjt.	Gibbs, G. A.	16399	S.-Serjeant	Elliott, R. W.
16447	Serjeant ..	Ashworth, J. W.	15859	Corporal ..	Arnold, P.
19747	Corporal ..	Hyde, C. H.	19710	Lce.-Corpl.	King, H. S.
113	Lce.-Corpl.	Powell, J. D.	19776	„	Swann, G.
19630	„ ..	Taylor, A.	11	Private ..	Andre, J.
1644	Private ..	Flavell, C. W.	19749	„ ..	Reynolds, J.

FROM BERMUDA, PER S.S. "ORUBA," MARCH 2, 1914.

11066	Sjt.-Major	Lee, H. B.	10932	Qmr.-Serjt.	Ward, C.
17413	Serjeant ..	Tweed, E.	12441	S.-Serjt. ..	Hubbard, L.
18158	„ ..	Pursey, G. P.	1276	Private ..	Cooper, H.
2151	Private ..	Church, A. W.			



## FROM JAMAICA, PER S.S. "ORUBA," MARCH 2, 1914.

14464	S.-Serjt. ..	Hurran, G. F.	14663	S.-Serjt. ..	Snow, P.
18427	Corporal ..	Barber, P.	2147	Corporal ..	Hampson, W. C.
12047	Lce.-Corpl.	Eley, H. A.	19853	Lce.-Corpl.	Bonehill, W. A. J.
19729	Private ..	Tomlin, J.	2025	Private ..	Dawson, S.
1866	" ..	Sugden, W.	1400	" ..	Bamber, E.
1746	" ..	McLachlan, E. J.	2030	" ..	Tucker, G. H.

## FROM MALTA, PER H.T. "DONGOLA," MARCH 10, 1914.

16323	Serjeant ..	McKenna, W.	19211	Corporal ..	Bowen, G.
1097	Corporal ..	Herbert, R.	22	Lce.-Corpl.	Church, W. R.
1149	Private ..	Boxall, H.	19103	Private ..	Noble, H. G.
1493	" ..	Parsons, J.	1420	" ..	Smith, S.
1662	" ..	Stanley, G.	19551	" ..	Tims, A.
1111	" ..	Worrad, W. P.	835	" ..	Jonathon, D. H.
18109	" ..	Bridge, F. R.	1131	" ..	Burge, F. V.
5843	" ..	Fraser, J.	1247	" ..	Buckland, F. E.
17898	" ..	Knagg, W.			

## FROM GIBRALTAR, PER S.S. "GAIKA," FEBRUARY 26, 1914.

14538	Serjeant ..	Wells, H.			
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## DISCHARGES.

14505	Qmr.-Serjt.	Jones, H. .. ..	31.1.14	Free after twelve years.
17227	Serjeant ..	Blatter, J. .. ..	10.2.14	Termination of first period.
17215	Corporal ..	Lilley, W. A. .. ..	11.2.14	" " "
19354	" ..	Sanders, H. .. ..	28.2.14	Medically unfit. " "
9985	" ..	Rogerson, E. J. .. ..	8.3.14	Termination of second period.
19446	" ..	Davies, D. .. ..	12.3.14	On payment of £18.
17380	Private ..	Haigh, J. W. D. .. ..	5.3.14	Termination of first period.
17400	" ..	Sarsfield, P. .. ..	12.3.14	" " "

**NOTE FROM LONDON.**—The Director-General and the officers of the Royal Army Medical Corps entertained Surgeon-General Gorgas at dinner in the mess on Wednesday, March 18. Those present included Surgeon-General May (Director-General of the Royal Naval Medical Service), Sir William Osler, Sir Ronald Ross, Professor Martin, Professor Nuttall, and Surgeon-General Evatt.

**NOTES FROM SIERRA LEONE.**—Major W. M. B. Sparkes writes, dated February 24, 1914: "On Monday, February 2, the officers of the Royal Army Medical Corps held their annual gymkhana on the recreation ground, Freetown. The gymkhana has now almost become looked upon as one of the recognized social events of the year. Our guests were received by Major Taylor, who is acting S.M.O. during the absence on leave of Lieutenant-Colonel Gerrard.

"Tea was served at 4 p.m., the gymkhana commencing at 4.30. The entries for all the events were very good.

"The menagerie race was the most amusing event, there being ten entries; the animals at the starting point (dogs barred) were monkeys, a chimpanzee, a sheep, a duck, a rat, baboons, a hen. The race was won by Mr. Massey, of the West African Regiment, who drove the sheep, or I should say, the sheep pulled him.

"At the conclusion of the races the prizes were presented to the winners by Mrs. Hollis, the wife of the Acting Governor.

"A word of praise is due to our non-commissioned officers for helping us with the decorations and looking after the refreshments.

## " PROGRAMME.

- " (1) Hammock Race.
- " (2) Blindfold Driving Race.
- " (3) Drawing Competition.
- " (4) Whistling Race.
- " (5) Orange Race.
- " (6) Menagerie Race.
- " (7) Banana Race.

"I regret to have to announce the death of Captain Farrant, from liver abscess, which took place at Tower Hill on February 10. Captain Farrant was one of the most popular men out here; his genial manner and good nature endeared him to all.

"On February 21 the freightship 'Batanga' arrived, bringing out Major Pollock, Captains Brod, Cromie, and Ormrod, who relieve Majors Taylor, Houghton, and Unwin."

**NOTES FROM DELHI.**—Lieutenant-Colonel A. P. Blenkinsop, R. A. M. C., Assistant-Director, Medical Services (British Service), writes as follows, dated February 19, 1914: "*Appointments.*—Colonel R. S. F. Henderson, K.H.P., British Service, has been appointed Assistant Director of Medical Services, 4th (Quetta) Division, with effect from March 6, 1914.

"Captain A. G. Jones, R.A.M.C., has been appointed Staff Surgeon at Rawalpindi, temporarily.

"*Casualties.*—Major F. A. Stevens has been transferred to the half-pay list from February 4, 1914, on account of ill-health.

"*Leave.*—General leave *ex* India to the undermentioned officers has been concurred in:—

"Lieutenant-Colonel E. M. Hassard, six months from April 11, 1914, to October 10, 1914.

"Captain J. Startin, six months from March 25, 1914, to September 24, 1914.

"Captain A. L. Stevenson, six months from May 1, 1914, to October 31, 1914.

"Captain W. J. Dunn, six months from March 25, 1914, to September 24, 1914.

"Captain C. G. Sherlock, six months from April 7, 1914, to October 6, 1914.

"*Specialists.*—The following officers have been appointed specialists in the subject and division noted against them:—

"Captain A. T. Frost, Dermatology, 6th (Poona) Division.

"Lieutenant T. A. Weston, Advanced Operative Surgery, 8th (Lucknow) Division.

"Lieutenant T. E. Osmond, Dermatology, 8th (Lucknow) Division."

### **SPECIAL RESERVE OF OFFICERS.**

#### **ROYAL ARMY MEDICAL CORPS.**

The undermentioned Lieutenants to be Captains: Sarsfield J. A. H. Walshe, M.B., dated February 15, 1914; Clarence E. Greeson, M.B., dated February 18, 1914; George H. Stevenson, M.B., dated March 1, 1914.

The undermentioned Lieutenants resign their commissions: Charles W. C. Myles, M.B., dated January 7, 1914; John Fraser, dated February 7, 1914; John H. C. Grenc, M.B., dated March 4, 1914.

The undermentioned to be Lieutenants (on probation): Cadet-Serjeants John Patrick Huban and James O'Shaughnessy Beveridge, from the Royal College of Surgeons in Ireland Contingent, Officers Training Corps, dated February 2, 1914; Albert Frederick Leopold Shields, late Corporal, Belfast University Contingent, Officers Training Corps, Cadet-Serjeant Frederick McKibbin, from the Belfast University Contingent, Officers Training Corps, and Cadet-Serjeant Thomas Macnaughtan Davie, from the Edinburgh University Contingent, Officers Training Corps, dated February 5, 1914; Cadet-Serjeant Campbell McNeill MacCormack, from the Belfast University Contingent, Officers Training Corps, dated February 12, 1914; Cadet Colour-Serjeant Evan Davies, from the Birmingham University Contingent, Officers Training Corps, dated February 19, 1914; Cadet-Corporal Andrew John Horne, from the Dublin University Contingent, Officers Training Corps, and Cadet-Corporal George Alexander MacDonald, from the Edinburgh University Contingent, Officers Training Corps, dated February 20, 1914; Cadet Joseph Henry Cranston Walker, from the Dublin University Contingent, Officers Training Corps, dated February 21, 1914; John Gray Ronaldson, M.B., dated February 23, 1914; Cadet Robert Forgan, from the Aberdeen University Contingent, Officers Training Corps, dated March 4, 1914.

### **TERRITORIAL FORCE.**

#### **ROYAL ARMY MEDICAL CORPS.**

*3rd Home Counties Field Ambulance.*—Horace Townsend Newman Merrick, M.B., to be Lieutenant, dated March 4, 1914.

*2nd London Clearing Hospital.*—Captain Frederick William Higgs, M.D., from the List of Officers attached to other Units, to be Captain, dated January 29, 1914.

*South Midland Clearing Hospital.*—Douglas Percy Taylor to be Quartermaster, with the honorary rank of Lieutenant, dated January 29, 1914.

*South Midland Clearing Hospital.*—Bernard Grainger Goodwin, F.R.C.S. (late Lieutenant, Royal Army Medical Corps), to be Captain, dated December 4, 1913.

*3rd East Anglian Field Ambulance.*—Lieutenant Alexander Graham, M.B., to be Captain, dated January 7, 1914.

*3rd Home Counties Field Ambulance.*—Lieutenant James Barkley to be Captain, dated February 3, 1914.

*Notts and Derby Mounted Brigade Field Ambulance.*—Captain Alexander R. Tweedie, F.R.C.S., to be Major, dated March 14, 1914.

*Yorkshire Mounted Brigade Field Ambulance.*—John Downie, M.B., to be Lieutenant, dated January 24, 1914; Lieutenant Thomas E. Lister, M.B., resigns his commission, dated March 14, 1914; Edward Douglas Ellis to be Lieutenant, dated March 14, 1914.

*5th London Field Ambulance.*—William Bertram Hill, M.D., to be Lieutenant, dated February 17, 1914.

*2nd Lowland Field Ambulance.*—William Hislop Manson, M.D., to be Lieutenant, dated February 17, 1914.

*Northumbrian Clearing Hospital.*—Captain William Thomas Harkness, M.B., from 1st Northumbrian Field Ambulance, to be Captain, dated March 14, 1914.

*2nd South Western Mounted Brigade Field Ambulance.*—Captain John R. Benson, F.R.C.S., to be Major, dated March 15, 1914.

*2nd East Lancashire Field Ambulance.*—Major Fred D. Woolley resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated March 21, 1914.

*2nd Welsh Field Ambulance.*—Charles William Chester Myles, M.B. (late Lieutenant, Royal Army Medical Corps, Special Reserve), to be Lieutenant (to be supernumerary) dated March 25, 1914; Ivor Jones Davies, M.D., to be Lieutenant (to be supernumerary), dated February 16, 1914.

*3rd Northern General Hospital.*—Major Arthur M. Connell, F.R.C.S. Edin., to be Lieutenant-Colonel, dated February 20, 1914.

*Wessex Clearing Hospital.*—Captain Clarence Isidore Ellis, M.D., from the list of officers attached to other units, to be Major, dated March 25, 1914.

#### OFFICERS ATTACHED TO OTHER UNITS.

Lieutenant William J. Harrison, M.B., to be Captain, dated October 29, 1913.

Major William T. Hannah, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated March 4, 1914.

James Ettershank Gordon Thomson, M.B., to be Lieutenant, dated December 27, 1913.

William Simpson McCune, M.B., to be Lieutenant, dated January 3, 1914.

Edmund Frederic Rose (late Surgeon-Lieutenant, 3rd Volunteer Battalion, The Queen's (Royal West Surrey Regiment), to be Lieutenant, dated March 4, 1914.

Captain Charles R. Browne, M.D., to be Major, dated January 5, 1914.

Kenneth Douglas Wilkinson, M.B. (late Cadet Serjeant, Birmingham University Contingent, Senior Division, Officers' Training Corps), to be Lieutenant, dated January 23, 1914.

James Anderson, M.B., to be Lieutenant, dated January 31, 1914.

Lieutenant Cecil William Rowntree, M.B., F.R.C.S., from the 3rd London (City of London) Field Ambulance, to be Lieutenant, dated February 18, 1914.

Lieutenant Cuthbert D. S. Agassiz, M.B., to be Captain, dated October 30, 1913.

Lieutenant Francis D. Blandy, M.D., to be Captain, dated November 3, 1913.

Lieutenant Edward O. Libbey, to be Captain, dated February 16, 1914.

Major William B. Fergusson, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated March 21, 1914.

#### SUPERNUMERARY FOR SERVICE WITH THE OFFICERS' TRAINING CORPS.

Quartermaster-Serjeant Philip Henry Mitchiner, M.B., F.R.C.S., serving with the University of London Contingent, Senior Division, Officers' Training Corps, to be Lieutenant, for service with the medical unit of that contingent, dated March 4, 1914.

#### QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

*Postings and Transfers.*—Matron: Miss G. M. Richards, to London, from Aldershot. Staff Nurses: Miss E. Schafer, to Cosham, from Netley; Miss M. R. Casswell, to York, from Aldershot; Miss C. A. Stevens, to Netley, from York; Miss C. M. Pearce, to Aldershot, from York; Miss A. Bradley, to York, from Woolwich; Miss E. Gibson, to London; Miss G. Witter, to Woolwich; Miss E. V. L. Clarke, to Curragh, on provisional appointment.

*Appointments Confirmed.*—Staff Nurses: Miss M. J. Riddell, Miss I. Carruthers, Miss E. M. Davies, Miss A. M. E. C. Charles.

*Arrivals.*—Miss M. Pedler, Sister, from Egypt; Miss M. German, Sister, from Egypt.

## ANNUAL DINNER.

THE Annual Dinner of the Officers of the Royal Army Medical Corps will take place on Monday, June 15, 1914, in the "Empire and Alexandra Rooms," Trocadero Restaurant, Piccadilly Circus, W., at 8 o'clock. *President:* The Director-General, Army Medical Service.

The price of dinner tickets to subscribers will be 7s. 6d. The price to non-subscribers will be £1 12s. 6d. It is particularly requested that early application for tickets be made, both by subscribers and non-subscribers, in order that the number attending may be approximately known as soon as possible. Non-subscribers when applying for tickets should forward the sum of £1 12s. 6d. by cheque or P.O.O., made payable to the Hon. Secretary. The price of the dinner ticket will be collected from subscribers at the restaurant on the night of the dinner.

The following officers will be regarded as subscribers:—

(1) All existing subscribers to the old Royal Army Medical Corps Dinner Fund, provided they have paid their subscriptions to that fund for this year.

(2) All subscribers to the Royal Army Medical Corps Fund,<sup>1</sup> provided their subscriptions are credited to the fund before the date of the dinner.

Selected musicians from the Royal Army Medical Corps Band will perform during dinner.

Besides one long table there will be small separate tables to allow of eight officers sitting at each, and these will be reserved for parties of eight officers who wish to dine together, if they will arrange to notify the names to the Hon. Secretary before Thursday, June 11.

A plan of the tables will be on view at the restaurant on the day of the dinner, in order that officers who have not made up parties may select the places at which they wish to sit. A list of officers who have notified their intention of dining will also be on view.

N.B.—The Monday in Ascot Week has been fixed as the day on which the dinner will be held each year. Miniature medals will be worn.

G. B. STANISTREET, *Lieut.-Colonel, R.A.M.C.,*  
*Hon. Secretary R.A.M.C. Annual Dinner Committee,*

*c/o Messrs. Holt & Co.,*  
*3 Whitehall Place, S.W.*

## ROYAL ARMY MEDICAL CORPS CENTRAL MESS AND GAMES COMMITTEE.

### NOTICE.

THE Committee, considering it highly desirable that, ultimately, all officers of the Corps should become subscribers to the Central Mess Fund, will make recommendations on the lines stated below (with possible additions to be published later) to the Annual General Meeting, which will be held in June next on the day of the Corps Dinner. Any officer desirous of submitting propositions connected with this Fund should send a statement of them to the Honorary Secretary before May 1, 1914. Such proposals should be accompanied by the names of proposer and seconder. If there is no valid objection to their discussion at the meeting they will be published in the June number of the CORPS JOURNAL.

The following are the recommendations referred to above:—

(1) That all officers joining the Corps after March 1, 1914, who wish to become subscribers to the Central Mess Fund shall pay an entrance fee of £5 5s. and thereafter an annual subscription equivalent to one half of one day's pay of their rank and service, at British rates, on March 1, at which date their subscription shall be due in advance. (The above proposal is based on the fact that at present a young officer on joining pays £2 to the London mess, £2 16s. at Aldershot, and afterwards joining contributions to other messes at home and abroad. In days gone by, when the officer on probation drew 8s. a day, instead of 14s., he paid £5 5s. at Netley, and other contributions elsewhere.)

(2) That all other officers on the active, half-pay, and retired lists shall become

<sup>1</sup> Officers who have specially excluded the annual dinner in the allocation of their subscription will of course be excepted.

members on payment of the annual subscription only. (It will be remembered that at the last Annual Meeting a resolution was adopted "that officers on the retired and half-pay lists be eligible as subscribers to the Fund, and that their annual subscription be at the rate of one half of one day's retired or half-pay of their rank. That messes be invited to accord the privilege of honorary membership to such subscribers.")

(3) Quartermasters will be considered honorary members of the Central Mess Fund without the payment of an annual subscription.

(4) That officers subscribing as above and the honorary members there mentioned shall be relieved of all joining contributions to messes (including those paid on promotion), the payment of such to be a charge on the Central Fund.

(5) That, as a tentative measure, such payment be made every quarter from the Central Fund, on requisition by the honorary secretaries of the various messes.

(6) That no increase in the existing rate of joining contributions be made without reference to the Central Mess Committee; and that the case of those messes which impose no joining contribution be specially considered.

(7) That the above payments from the Central Fund take place, retrospectively, as from March 1, 1914. Such joining contributions as may have been paid to messes between that date and the receipt of these resolutions be refunded direct to the members by the Honorary Secretary, Central Mess Committee, on production of a voucher.

### NOTES ON GAMES AND SPORT.

*Association Football.*—Serjeant-Major Drury, Hon. Secretary R.A.M.C. Football Club, writes from Aldershot: "As stated in the last notes, we drew with Bromley on February 14 in the 3rd round Amateur Cup. We protested and won our case. The replay was ordered by the Association to take place at Aldershot on the 21st ult., and after a brilliant display of football on both sides we won by the excellent margin of 6 goals to 1.

"Before going further I should like all to know that our protest was based on the fact that the game was not finished on the first occasion. Nearly all the papers stated we protested because our opponents were ten minutes late turning out in the field. At the inquiry the Referee stated: 'On the day of the match he was not aware that extra time had to be played in the event of a draw, but even if he had known, the light would not have permitted the game to finish on account of the Bromley team turning up ten minutes after time.'

"On February 25 we were to have met the Connaught Rangers in the Aldershot Senior League, but they scratched to us after our team were in the field.

"On February 28 we met Barnet and Alston in the 4th round English Amateur Cup, and after a well contested game, on the worst ground we have ever played on, we won by 3 goals to 1.

"On March 4 the team travelled to Colchester, and were accommodated at the Military Hospital at that Station. (The Committee would like to take this opportunity of thanking the officer in charge, Serjeant-Major Genese, Quartermaster-Serjeant Le Poidevin, Serjeant Blundell, and the Hospital staff for their kindness and hospitality on that occasion.) The next day we met the 1st Hampshire Regiment in the 'Fatal Fifth' round Army Cup. This we lost by 5 clear goals. Our wing men, who depend upon their speed were handicapped by the small size of the ground.

"On March 14 we met Bishop Auckland in the Semi-final English Amateur Cup at Stockton-on-Tees, the result being a goal-less draw. It was the finest exhibition of football given this year by the team.

"The following paragraph from *The Sports Gazette*, Bishop Auckland, dated March 16, sums up the game in a few words:

"The game was a very fine one, fought in the most sportsmanship fashion by both sides; true there were failures by players on both sides, or goals would have been scored, but when the play is taken as a whole it is certain the result was a fitting one to a stirring and interesting contest. Both goalkeepers acquitted themselves splendidly."

"The Corps team was defeated at Watford on the 21st inst. in the replayed semi-final round of the F.A. Amateur Cup Competition by Bishop Auckland (3-1). Corporal Prince and Private Morris have been chosen to play for the Army in England v. Army in Ireland.

"We have withdrawn from the Aldershot Senior League, as the Central Committee only gave us up to the 14th of March to complete our fixtures; this meant six matches in seven days with the Amateur Cup Semi-final thrown in. We regretted we were compelled to adopt this procedure."

*Rugby Football.*—Lieutenant J. L. Huggan, playing for the Army against the Navy, had a large share in the victory of the former by 4 goals and 2 tries to 1 goal and 3 tries, as the following extract from the *Times* of March 9 will show:—

"Broadly, it was a game between the Army forwards and the Navy half-backs, where the balance was even; it was turned in favour of the Army by a wing three-quarter back, J. L. Huggan, who played the finest game in his career. His unerring fielding of the ball and his determination to get through were reminiscent of the play of V. H. M. Coates last season. He is not fast, but avoids a tackle in his raking, ugly stride by calling forth extra pace when required. His cross-kicking, which he used just at the right times, was as accurate as that of T. W. Pearson, who perfected, if he did not invent, this manœuvre in the early '90's. He was playing outside to R. M. Scobie, the Scottish International, and one may surmise that he will be included in the Scottish side against England in the match for the Calcutta Cup in a fortnight's time."

Lieutenant J. L. Huggan played for Scotland v. England in the recent match.

*Golf.*—The following notice has been received from the Hon. Secretary, Army Golfing Society, who would be glad to receive the names of any officers wishing to join the Society.

Army Golfing Society meeting to be held on the links of the Woking Golf Club, May 11 and 12, 1914.

*May 11.*—36 holes Medal Play, under handicap, for first and second prizes presented by the Society. There will also be a prize for the best scratch score. Open to all officers who are serving or who have served as regular officers in the regular Army.

*May 12.*—*Morning*: 18 holes Medal Play, under handicap, for prize presented by the Society. *Afternoon*: Foursomes *versus* "Bogey," for prizes presented by the Society. Both events open to members of the Society only. There will be optional sweepstakes on all events.

N.B.—(1) Competitors when entering must state their lowest official club handicaps. If possessing no handicap, they must forward two cards (medal play) and state the "bogey" of the course on which the rounds were played.

(2) Competitors must notify the Hon. Secretary when entering if they require a partner in any or all of the events; if they do not, who their partner will be.

Play will start at 10 a.m. each day. Entries will close on May 4.

Torrington,

Hoylake, Cheshire.

CAPTAIN L. NICHOLLS,

Hon. Secretary.

*Note.*—Any officer who is serving or has served as a regular officer in the regular Army can join the Society at any time on payment of £1 ls. for life membership.

*Racing.*—At the Grand Military Meeting at Sandown, Captain O'Brien-Butler rode the winner of the United Service Selling Handicap Steeplechase. He was third in the Past and Present Steeplechase, which race he has previously won three years in succession.

3, Homefield Road,  
Wimbledon Common, S.W.

J. T. CLAPHAM, Captain,

Hon. Secretary.

## UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Thursday, April 9, 1914, at 5 p.m. Business, "The Scope of the Field Ambulance as a Training School," Major Josiah Oldfield, R.A.M.C. (T. F.).

*Synopsis of Paper.*—Field ambulance medical officer—Regimental medical officer—Present insufficient training of the latter—Want of co-ordination of the two—Field ambulance to be the one portal for all medical officers' training—Medical officers to be posted from the field ambulance for regimental duties—All medical officers to be under the command of the commanding officer of the field ambulance when in camp together—Place of the band as stretcher-bearers—Training of the regimental stretcher-bearers should be through the field ambulance—Regimental stretcher-bearers should drill with the field ambulance when in camp together—Failure of regimental stretcher-bearers during field exercises—No co-ordination at present between regimental treatment and field ambulance treatment of wounded—Water-duty men, sanitary men, and the medical officer—Orderlies should all be provided by the field ambulance, should be trained in the field ambulance, and the officer commanding field ambulance should be responsible for their efficiency.

F. C. STANFORD, *Staff-Surgeon, R.N.*

G. A. D. HARVEY, *Captain, R.A.M.C.*

*Joint Hon. Secretaries.*



## ROYAL ARMY MEDICAL CORPS FUND.

NOTICE OF THE TWELFTH ANNUAL GENERAL MEETING, 1914.

THE Annual General Meeting of the subscribers to this Fund will be held in the Library of the Royal Army Medical College, Grosvenor Road, S.W., at 2 p.m., on Monday, June 15, 1914. The Director-General will preside.

It is hoped that officers will freely express their views on any point connected with the Fund. Subscribers who wish for information on any special point are requested to communicate with the Secretary so that information may be furnished in response to any question asked.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*  
124, Victoria Street, S.W. *Secretary.*

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## ROYAL ARMY MEDICAL CORPS OFFICERS' BENEVOLENT SOCIETY.

THE Annual General Meeting of the subscribers to this Society will be held in the Library of the Royal Army Medical College, Grosvenor Road, S.W., at 3 p.m., on Monday, June 15, 1914. The Director General will preside.

It is hoped that officers will freely express their views on any point connected with the Society. Subscribers who wish for information on any special point are requested to communicate with the Secretary, so that information may be furnished in response to any question asked.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*  
124, Victoria Street, S.W. *Secretary.*

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## R.A.M.C. WARRANT OFFICERS' AND SERJEANTS', PRESENT AND PAST, ANNUAL DINNER CLUB.

THE Committee cordially thank and send greetings to all members at home and abroad for their loyal support during the year now closing and confidently appeal for a further continuance of encouragement for future years.

The arrangements for the Sixth Annual Dinner under the presidency of the Director-General at Anderton's Hotel, Fleet Street, on April 15 are now complete; all particulars can be obtained from the Hon. Secretary. Tickets 3s. 6d.

A plan is in hand whereby messes, &c., of the Corps have been invited to appoint local secretaries to assist in collecting subscriptions, notifying changes, &c., by which means it is hoped still further to increase the club's sphere of usefulness; names and particulars will be published later.

A full report of the Dinner, also notification of the Annual General Meeting, will be published in the Corps Journal, and with regard to the General Meeting it is hoped the larger centres of the Corps will appoint and send representatives, who are cordially invited.

In conclusion the Committee, in view of the success which has attended their efforts during the past year, sincerely hope, especially as the annual subscription is so small, that more mess members will see their way to join up the only link existing to further the goodwill and fraternal comradeship so essential to the welfare of the club, and feel confident this appeal will not pass unheeded.

*Royal Herbert Hospital,*  
*Woolwich, S.E.,*  
*March, 1914.*

FRED G. COURT,  
*Staff-Serjeant, R.A.M.C.,*  
*Hon. Secretary.*

The Chairman and Committee of the Veterans' Club, Bedford Row, W.C., have much pleasure in inviting all the members to consider themselves honorary members of the club from April 14 to 21. Suggested means of identity for admission, production of dinner ticket.

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## ROYAL ARMY MEDICAL COLLEGE.

LIEUTENANT-GENERAL SIR JAMES GRIERSON, K.C.B., C.V.O., C.M.G., will distribute the prizes at the Royal Army Medical College, on Friday, May 1, at 4 p.m.

## OBITUARY.

### COLONEL WALTER AUGUSTUS PARKER.

COLONEL W. A. PARKER died at Hastings on March 4, 1914, aged 64. He was educated at St. George's Hospital, and obtained the diplomas M.R.C.S. Eng. and L.R.C.P. Lond. in 1871. He joined the Army as Surgeon, Army Medical Department, on February 3, 1878, was promoted Surgeon-Major, Medical Staff, on February 3, 1890, and Surgeon Lieutenant-Colonel, Army Medical Staff, on February 3, 1898. He served abroad in Jamaica, Barbados, China, Straits Settlements, India, and Malta. He retired on February 23, 1898 and held retired-pay appointments at Reading, Exeter, and Penally. On October 18, 1902, he was promoted Colonel on the retired list in recognition of his services during the operations in South Africa. He had no war service.

### LIEUTENANT-COLONEL JAMES WILL.

LIEUTENANT-COLONEL J. WILL died at Dunton Green, Kent, on March 9, 1914, aged 55. He was born at North Quillquox, Tarvas, Aberdeenshire, and received his medical education at Aberdeen University. In 1883 he obtained the Senior Thompson Medical Bursary, and graduated M.B., C.M. with honours in 1884. He joined the Service as Surgeon, Medical Staff, on July 28, 1897, gaining the second prize in pathology at the end of the course at Netley. He served abroad in Hong Kong, Barbados, and Uganda. On the occasion of the destruction of St. Pierre, Martinique, he rendered valuable assistance, for which he was thanked by the Secretary of State for the Colonies and received a "eulogistic public address" from the inhabitants of St. Vincent. He was promoted Major, Royal Army Medical Corps, on July 28, 1898, and on February 20, 1904, was seconded for service under the Foreign Office and became P.M.O. in the East Africa and Uganda Protectorate, and a member of the Legislative Council of British East Africa. He was commended by the Governor of East Africa for his services. He served in the Mandi Expedition 1905-6 and received the medal and clasp. He was promoted Lieutenant-Colonel on July 28, 1906, and selected for increased pay on September 13, 1913.

He was appointed D.A.D.M.S. of the Northumbrian Territorial Division on March 1, 1911, and served in that capacity until his retirement on November 5, 1913.

### MAJOR JOHN GREER BLACK.

MAJOR J. G. BLACK died at Portrush, Co. Antrim, on March 1, 1914. He was educated at Queen's College, Galway, and took the degree of M.D., R.U.I., in 1881 and M.Ch. in 1882. He joined the Army as Surgeon, Medical Staff, on January 30, 1886, and was promoted Surgeon-Major, Army Medical Staff, on January 30, 1898. He served abroad in India, Gibraltar, South Africa, and Wei-Hai-Wei. His war service was: Relief of Ladysmith, including operations of February 17 to 24, 1900; operations on Tugela Heights, February 14 to 17, 1900; operations in Natal, March to June, 1900. He was mentioned in dispatches and received the Queen's medal with five clasps, and the King's medal with two clasps. He was placed on retired pay on January 30, 1906.

### QUARTERMASTER AND HONORARY MAJOR DAVID McINTYRE.

MAJOR D. McINTYRE died on February 28, 1914, aged 71. He enlisted in the 2nd Battalion 2nd Regiment on June 21, 1860, and transferred to the Army Hospital Corps January 1, 1865. He received Her Majesty's Commission as Lieutenant of Orderlies on June 9, 1877, and was promoted Honorary Captain June 9, 1887. He was granted the Honorary rank of Major, October 18, 1902, for service at home during the South African war.

## BIRTHS.

PROBYN.—On December 24, 1913, at Denison Hall, Leeds, the wife of Major Percy J. Probyn, D.S.O., a daughter.

CREE.—On February 28, at Harley Lodge, Cheltenham, the wife of Lieutenant-Colonel G. Cree, a son.

WAY.—On March 6, at 7, Convent Road, Wynberg, South Africa, the wife of Captain Leslie Way, R.A.M.C., a son.

## GOLDEN WEDDING.

ON March 9, 1864, at St. Paul's Church, Umballa, India, by the Rev. Fitz-Henry W. Ellis, Chaplain, Alexander Frederick Bradshaw, Assistant Surgeon, 2nd Battalion the Rifle Brigade (The Prince Consort's Own), to Ellen Charlotte, only daughter of Colonel Richard Sheridan Ewart, retired list, Bengal Army. Present Address, 111, Banbury Road, Oxford.

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## DEATHS.

McINTYRE.—On February 28, at Portobello, Quartermaster and Honorary Major David McIntyre, late Army Medical Staff.

BLACK.—On March 1, at Portrush, Co. Antrim, Major John Greer Black, M.D., retired pay, late Royal Army Medical Corps, aged 55.

PARKER.—On March 4, at Hastings, Colonel Walter Augustus Parker, retired, Army Medical Staff, aged 64.

WILL.—On March 9, at Dunton Green, Kent, Lieutenant-Colonel James Will, M.B., retired pay, late Royal Army Medical Corps, aged 55.

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## EXCHANGES, &c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

Captain due for abroad next Trooping Season wishes to exchange Home. Apply "C. B.," c/o Messrs. Holt & Co.

Major due for foreign service Trooping Season 1916-17 willing to exchange to go Trooping Season 1914-15. Apply "Jehu," c/o Messrs. Holt & Co., 3, Whitehall Place, London, S.W.

Major probably due for abroad late 1914-15 Trooping Season wishes to exchange with an officer low down on the foreign roster. Apply "Job," c/o Messrs. Holt & Co.

Major due for foreign service next Trooping Season wishes to exchange with an officer low down on roster. Apply "Aeroplane," c/o Messrs. Holt & Co., Whitehall, London.

Captain who arrived home March, 1913, is willing to go abroad again this coming Trooping Season for suitable bonus. Apply "Travers," c/o Messrs. Holt & Co., Whitehall, London.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates :—

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	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
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\* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that may happen to appear on the first and last pages of the particular excerpt ordered.

**CASES FOR BINDING VOLUMES.**—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates :—

Covers, 1s. 4d. net; binding, 1s. 2d.

These charges are exclusive of cost of postage.

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*All Applications for Advertisements to be made to—*

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The back outside cover is not available for advertisements.

## Notices.

### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

**All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.**

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Major W. S. Harrison, Captain K. Reed, Lieutenant B. Richardson Billings, Lieutenant T. O. Thompson, Captain J. E. H. Gatt, Major E. E. Powell, Lieutenant-Colonel G. Cree, Lieutenant G. H. Stringer, W. Henfrey, Captain R. M. Dickson, Captain S. E. Lewis, Lieutenant-Colonel H. E. R. James, Captain A. W. Howlett, Colonel P. Hehir, Major L. F. Smith, Captain W. F. M. Loughnan, Major W. R. P. Goodwin, Major E. P. Sewell, Lieutenant-Colonel W. Beever (R.P.), Lieutenant C. J. Coppinger, Lieutenant-Colonel J. T. Fotheringham, Lieutenant-Colonel D. M. O'Callaghan, Lieutenant W. F. Christie, Colonel H. J. Mackay, Quartermaster-Serjeant E. B. Dewberry, Captain G. H. Dive, Major J. V. Forrest, Lieutenant-Colonel J. H. E. Austin, Major C. F. Wanhill, Lieutenant J. C. Sproule, Major G. T. K. Maurice.

The following publications have been received:—

*British: Tropical Diseases Bulletin, St. Thomas's Hospital Gazette, Medical Press and Circular, The Army Service Corps Journal, The Journal of Mental Science, The Journal of State Medicine, Transactions of the British Proctological Society, British Medical Journal, The Hospital, The Practitioner, The Commonwealth Military Journal, Memoirs of the Department of Agriculture in India, The Lancet, Guy's Hospital Gazette, The Royal Engineers' Journal, The Australasian Medical Gazette, Army and Navy Gazette, The Medical Journal of South Africa, St. Bartholomew's Hospital Journal, Proceedings of the Royal Society of Medicine, Report of the Medical Officer of Health, Johannesburg, Journal of the Royal Sanitary Institute, Red Cross and Ambulance News, The Indian Medical Journal, The Medical Review, Public Health, Catalogue of the Library of the Royal United Service Institution, The Middlesex Hospital Journal, The Red Cross, Bulletin of Entomological Research, Journal of the Royal United Service Institution, The Medical Journal of South Africa.*

*Foreign: Bulletin de l'Institut Pasteur, No. 3, Le Caucée, Office International d'Hygiène Publique, Archiv für Schiffs- und Tropen-Hygiene, Deutsche Militärärztliche Zeitschrift, Festschrift zur 50 Jahr Stiftungsfeier der Berliner Militärärztlichen Gesellschaft, Der Militärarzt, Report of the Surgeon-General U.S. Army, Annales de Physiotherapie, Schmidts Jahrbücher der in- und ausländischen gesamten Medizin, Revista de Sanidad Militar, Archives de Médecine et de Pharmacie Militaires, Bulletin de la Société de Pathologie Exotique, The Military Surgeon, United States Public Health Service, Annales d'Hygiène et de Médecine Coloniales, American Medicine, Russian Naval Medical Journal, Schmidts Jahrbücher.*

## MANAGER'S NOTICES.

The **JOURNAL OF THE ROYAL ARMY MEDICAL CORPS** is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,  
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"  
WAR OFFICE, WHITEHALL, S.W.



# JOURNAL

OF THE

## ROYAL ARMY MEDICAL CORPS.

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### Corps News.

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MAY, 1914.

#### ARMY MEDICAL SERVICE.

Colonel Menus W. O'Keeffe, M.D., on completion of four years' service in his rank, is placed on the half-pay list, dated April 23, 1914.

Lieutenant-Colonel Charles C. Reilly, from the Royal Army Medical Corps, to be Colonel, *vice* M. W. O'Keeffe, M.D., dated April 23, 1914.

Major William R. Blackwell, Royal Army Medical Corps, to be a Deputy Assistant Director-General at the War Office, *vice* M. H. G. Fell, dated April 1, 1914.

#### ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenant-Colonels are placed on retired pay: Francis H. M. Burton, M.D., dated April 20, 1914; Michael L. Hearn, dated April 21, 1914.

The undermentioned Majors to be Lieutenant-Colonels: Edward M. Morphew, *vice* F. H. M. Burton, retired, dated April 20, 1914; Nicholas Tyacke, M.B., *vice* M. L. Hearn, retired, dated April 21, 1914.

The undermentioned to be restored to the establishment: Supernumerary Lieutenant-Colonel Charles A. Young, *vice* F. J. Morgan, dated April 1, 1914; Supernumerary Major Albert E. Hamerton, D.S.O., dated March 28, 1914; Supernumerary Lieutenants William K. Morrison, M.B., and Edgar Percival, M.B., dated April 1, 1914; Supernumerary Lieutenant Stanley J. Linzell, M.B., dated April 4, 1914.

**DECORATIONS.**—The King has been pleased to give and grant unto the undermentioned officers, His Majesty's Royal licence and authority to accept and wear Decorations (as stated against their names) conferred upon them by His Highness the Khedive of Egypt, authorized by His Imperial Majesty the Sultan of Turkey, in recognition of valuable services rendered by them: Third Class of the Imperial Ottoman Order of the Medjidieh, Captain William Edward Marshall. Fourth Class of the Imperial Ottoman Order of the Medjidieh, Captain Colin Cassidy.

**HIGHER RATE OF PAY.**—Lieutenant-Colonels J. J. Russell, T. DuB. Whaite, and H. T. Knaggs have been selected for the increased pay under Article 358, Royal Warrant for Pay and Promotion.

**ARRIVALS HOME FOR DUTY.**—From India: On March 6, Colonel (temporary Surgeon-General) W. G. Macpherson, C.M.G., K.H.P.; on April 2, Lieutenant-Colonel C. C. Reilly, Brevet-Colonel F. Smith, D.S.O., Major G. M. Goldsmith, Captains C. Scaife, D. M. Corbett, E. C. Phelan, and C. H. Denyer; on April 4, Surgeon-General Sir A. T. Sloggett, Kt., C.B., C.M.G., K.H.S.

Surgeon-General Sir A. Sloggett having reported his arrival in London on April 6, on completion of nearly six years' service in India, proceeded on leave. He will take over the duties of Director-General on June 1, on which date Sir Launcelotte Gubbins will be retired.

**ARRIVALS HOME ON LEAVE.**—Captains H. V. Bagshawe, T. H. Gibbon, C. Cassidy, T. McC. Phillips, P. G. M. Elvery, R. M. Davies and E. T. Gaunt.

**POSTINGS.**—Northern Command: Captain C. Scaife. Western Command: Captain D. M. Corbett. Eastern Command: Lieutenant-Colonel C. C. Reilly, Major S. W. Sweetnam, Captain R. J. C. Thompson. Irish Command: Brevet-Colonel F. Smith, D.S.O., Major G. M. Goldsmith, Captain E. C. Phelan. Southern Command: Captain C. H. Denyer. London District: Lieutenant-Colonel B. H. Scott.

**TRANSFERS.**—To Tidworth: Major E. W. Bliss, from Chatham. To the Eastern Command: Captain E. D. Caddell, from Dublin.

**APPOINTMENTS.**—Lieutenant-Colonel C. C. Reilly, Assistant-Director of Medical Services, Eastern Command. Brevet-Colonel F. Smith, D.S.O., Medical Inspector of Recruits, Irish Command. Major J. Matthews, Specialist in Ophthalmology, Northern Command.

**QUALIFICATIONS.**—Captain J. Fairbairn has obtained the Diploma in Public Health of the Royal Colleges of Physicians and Surgeons of Edinburgh and Royal Faculty of Physicians and Surgeons of Glasgow.

**ROSTER FOR SERVICE ABROAD.**—Lieutenant-Colonel F. R. Newland, Major J. B. Clarke, Captains H. O. M. Beadnell, W. J. Weston, W. Egan, and R. E. U. Newman have exchanged to higher positions on the roster with Lieutenant-Colonel G. T. Rawnsley, Major J. F. Martin, Captains A. C. Osburn, C. R. Sylvester-Bradley, M. Sinclair, and A. M. Rose, respectively.

**RESULTS OF EXAMINATIONS.**—The following results of examinations are notified for general information:—

Passed for the rank of Lieutenant-Colonel:—

In Appendix xiv, K.R., Part 1, and Appendix xi, K.R., Subhead (d) iii, Major J. McD. McCarthy.

In Appendix xiv, K.R., Part 1, Majors C. F. Wanhill and E. T. Inkson, V.C.

In Appendix xi, K.R., Subheads (d) ii and (d) iii, Major W. R. Blackwell.

In Appendix xi, K.R., Subhead (d) iii, Majors H. E. Staddon, J. Cowan, H. B. G. Walton, C. W. Mainprise, G. J. A. Ormsby, A. A. Seeds, J. W. West, A. D. Jameson, J. T. Johnson, E. Bennett, H. A. Bransbury, E. F. Q. L'Estrange, and J. L. Jones.

Passed for promotion to the rank of Major:—

In Appendix xi, K.R., Subhead (b): Captains J. E. Powell and E. C. Lambkin.

In Appendix xi, K.R., Subhead (c) ii: Captains H. St. M. Carter, R. P. Lewis, and G. G. Collet.

In Appendix xi, K.R., Subheads (d) ii and (d) iii, Captains D. G. Carmichael, C. Scaife, W. F. M. Loughnan, D. F. Mackenzie, O. R. McEwen, H. V. B. Byatt, D. B. McGrigor, A. G. Wells, and A. H. T. Davis.

In Appendix xi, K.R., Subhead (d) ii, Captains G. Petit and J. A. Renshaw.

In Appendix xi, K.R., Subhead (d) iii, Captains G. F. Rugg and R. G. H. Tate.

Passed for promotion to the rank of Captain:—

In Appendix xi, K.R., Subhead (c) ii: Lieutenants P. M. J. Brett and I. R. Hudleston.

In Appendix xi, K.R., Subheads (d) ii, (d) iii, and (h), Captain T. J. Hallinan.

In Appendix xi, K.R., Subhead (d) ii, Lieutenants W. T. Graham and T. A. Weston.

In Appendix xi, K.R., Subhead (d) iii, Lieutenants E. G. S. Cane, C. D. K. Seaver, and W. L. E. Fretz.

In Appendix xi, K.R., Subhead (h), Lieutenants C. M. Finny and J. S. Levack.

Major A. B. Smallman has passed the Preliminary Examination in the French language.

## MEMORANDUM.

The undermentioned officers will be required for service abroad during the coming trooping season. Information as to destination and dates of embarkation will be published as soon as possible :—

## LIEUTENANT-COLONELS.

Kennedy, A.  
Burtchaell, C. H.  
O'Callaghan, D. M.  
Russell, J. J.

Le Quesne, F. S., V.C.  
Scott, B. H.  
Morgan, J. C.  
Rawnsley, G. T.

Moore, S. G.  
Austin, J. H. E.  
Dalton, C.

## MAJORS.

Tyacke, N.  
Mitchell, L. A.  
McNaught, J. G.  
Thurston, H. S.  
Silver, J. P.  
Profeit, C. W.  
Fairrie, S. H.  
Birrell, E. T. F.  
Waring, A. H.  
Humphry, L.  
Curme, D. E.  
Prescott, J. J. W., D.S.O.  
Langstaff, J. W.

Knox, E. B.  
Henderson, P. H.  
Fry, W. B.  
Hyde, D. O.  
FitzGerald, FitzG. G.  
Lauder, F. P.  
Greenwood, A. R.  
Walker, F. S.  
McLennan, F.  
Steele, W. L.  
Carr, C. H.  
Myles, C. D.  
Smith, S. B.

Clarke, J. B.  
Woodley, R. N.  
Cowey, R. V.  
Bostock, J. S.  
Mitchell, A. H. McN.  
L'Estrange, E. F. Q.  
Winder, J. H. R.  
Beatty, M. C.  
Harding, D. L.  
Ainsworth, R. B.  
Balck, C. A. J. A.

## CAPTAINS.

Davidson, P., D.S.O.  
Conway, J. M. H.  
Kelly, H. B.  
Crawford, J. M. M.  
Bramhall, C.  
Fawcett, H. H. J.  
Lewis, S. E.  
Hanafin, P. J.  
Collins, R. T.

Otway, A. L.  
Hole, R. B.  
Harding, H.  
Grant, M. F.  
Moore, E. H. M.  
Buchanan, R. J. B.  
Beadnell, H. O. M.  
Richard, G. H.  
Emerson, H. H. A.

Weston, W. J.  
Stewart, H.  
Egan, W.  
Newman, R. E. U.  
Grogan, J. B.  
Leahy, M. P.  
Bevis, A. W.  
Nolan, R. H.

## LIEUTENANTS.

Price, R. B.  
Wignmore, J. B. A.  
Hare, J.  
Flood, R. A.  
Lang, E. C.  
Corbett, W. V.  
Poole, L. T.  
Balfour, T. H.  
Huggan, J. L.  
Cowtan, F. C.  
Jones, C. C.  
Porter, R. E.  
Shields, H. J. S.  
Power, P. M. J.  
Whitby, E. V.

Russell, E. U.  
Shaw, R. G.  
Stevens, N. W.  
Philipps, R. B.  
Urquhart, A. L.  
Whitehead, N. T.  
Sproule, J. C.  
Martyn, A. F. C.  
Allison, G. F.  
Hepper, J. E.  
Beddingfield, H.  
Davidson, F. C.  
O'Connell, J. F.  
Large, S. D.  
Helm, C.

Ball, W. O. W.  
Crocket, J.  
Sealy, H. N.  
Jackson, A.  
Beddows, E. C.  
Dyas, G. E.  
Thornton, C. V.  
Rowe, J.  
Croker, W. P.  
Bridges, A. B. H.  
Brown, A. G.  
Warburton, P. D.  
Hemphill, R.  
Smith, S. H.

## QUARTERMASTER.

Woollard, J.

The above detail does not provide for unscen vacancies abroad, which are of frequent occurrence, and the undermentioned officers whose names are high on the roster should hold themselves in readiness in the event of being required :—

Lieutenant-Colonel Rowan, H. D.	Captain McConaghy, W.
Major "Ward, W. A.	Lieutenant Rankin, H. C. D.
Major "Brakenridge, F. J.	Percival, E.
Captain Arthur, A. S.	Morrison, W. K.
Garland, F. J.	Woodhouse, B.
	Qm. and Hon. Lieut. Packard, J. T.

## WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.

THE FOLLOWING N.C.Os. AND MEN HAVE PASSED THE NECESSARY CORPS EXAMINATIONS FOR PROMOTION.

## FOR QUARTERMASTER-SERGEANT.

11049 | S.-Serjt. .. | Ulph, W. T. A.      || 11761 | S.-Serjt. .. | Walls, F. S.

## FOR SERJEANT.

15196 | Lce.-Serjt. | Pepper, C. T.      | 18621 | Corporal .. | Walton, A. J.  
18903 | Corporal .. | Male, A.

## FOR CORPORAL.

5023 | Private .. | Grist, R.      | 6515 | Private .. | Querney, D.

## APPOINTED BUGLER.

6997 | Boy .. | Mayl, A. R. D. .. | 28.3.14 | Vice W. E. Conway to ranks.

## TRANSFERS TO ARMY RESERVE.

5363	Pte.	Hunter, A. ..	9.3.14	5403	Pte.	Kershaw, H. ..	28.3.14
5367	"	Weston, A. J. ..	12.3.14	5417	"	Corrigan, J. F. ..	19.3.14
5352	"	Allanby, E. ..	7.3.14	934	"	Giles, T. ..	20.3.14
5378	"	Chatten, W. H.	13.3.14	5397	"	Wilkins, H. D. ..	23.3.14
5373	"	Busby, A. ..	13.3.14	5400	"	Brinscombe, S. R.	24.3.14
5374	"	Cox, J. W. ..	14.3.14	5405	"	Megenis, P. ..	28.3.14
5381	"	McColl, C. S. ..	15.3.14	5410	"	Downer, A. G. ..	27.3.14
18168	"	Wood, A. ..	13.3.14	5419	"	Hayes, T. ..	29.3.14
1800	"	Dunnage, W. E.	16.3.14	5420	"	Rigg, J. G. ..	30.3.14
5383	"	Ryan, W. ..	17.3.14	5404	"	Goodman, G. G.	23.3.14
5382	"	Muir, J. ..	17.3.14	5418	"	O'Regan, J. ..	29.3.14
5379	"	Harvey, F. ..	16.3.14	5424	"	McLardie, G. G.	29.3.14
5393	"	Allcock, J. T. ..	19.3.14	1092	"	King, E. B. ..	1.4.14
5387	"	Lee, T. ..	20.3.14	5414	"	Giles, J. R. ..	2.4.14
5398	"	Coles, W. C. ..	24.3.14	5422	"	Quinn, P. ..	5.4.14
5407	"	Rausom, A. G. ..	27.3.14	5433	"	Brouard, H. ..	31.3.14
5395	"	Coutts, G. ..	21.3.14	5431	"	Sarrah, J. E. ..	5.4.14
1089	"	Woods, H. ..	22.3.14	5434	"	Hughes, R. ..	9.4.14
5391	"	Hedley, J. ..	23.3.14				

## TRANSFERS FROM OTHER CORPS.

11827	Serjeant ..	Quinlan, M. K.	7.2.14	From Colonial Government.
7707	Private ..	Sheppard, E. E.	17.2.14	„ 1st Bn. Suffolk Regt.
7708	„ ..	Earl, A. A.	17.2.14	„ 1st Bn. Welch Regiment.

## TRANSFERS TO OTHER CORPS.

18090	Corporal ..	Wilson, A. C.	9.10.13	To R.F. Corps (M.W.)
7461	Private ..	Davies, F. W.	1.4.14	„ 118th Batty. R.F. Art.

## DISCHARGES.

10004	Staff-Serjt.	Elliot, C. .. ..	26.3.14	Termination of second period.
10012	Serjeant ..	Doyle, P. .. ..	10.4.14	„ „ „
6338	Private ..	Neagle, J. I. ..	28.3.14	Physically unfit. „ „
17496	„ ..	Browne, C. .. ..	26.3.14	Termination of first period.
7558	„ ..	Kelly, J. .. ..	16.3.14	On payment of £10.
7635	„ ..	Daykin, S. J. ..	16.3.14	„ „ „
4656	„ ..	Mathieson, G. ..	24.3.14	Free under Art. 1131, P.W.
7477	„ ..	Peacock, H. ..	24.3.14	On payment of £10.
7018	„ ..	Mower, S. T. ..	7.4.14	Physically unfit.

## DISEMBARKATIONS FROM ABROAD.

## FROM SIERRA LEONE, PER S.S. "BATANGA," MARCH 14, 1914.

16287	S.-Serjt. ..	Saunders, W. E.	218	Lce.-Corpl.	Dale, L. A.
19320	Serjeant ..	Rilchie, H. A.	10471	Private ..	Baldwin, A. R.
17714	Lce.-Serjt.	Robinson, A. R.	288	„ ..	Sheehan, J. W.

## FROM GIBRALTAR, PER H.T. "SOMALI," MARCH 14, 1914.

17768	Serjeant ..	Duerden, G.	305	Private ..	Hobbes, J. W.
16448	Corporal ..	Buchan, A.	968	„ ..	Fairweather, R. E.
11631	„ ..	Chipchase, H.	1011	„ ..	Ross, H. C.
19821	Lce.-Corpl.	Young, B. L.	1956	„ ..	Whiddon, P. H.
19824	„ ..	Worrell, C. H.	1930	„ ..	Burden, F.
19946	„ ..	Hillier, W. J.	17015	„ ..	Moore, A.
94	„ ..	Price, D. W.	934	„ ..	Giles, T.

## FROM S. AFRICA, PER H.T. "SOMALI," MARCH 19, 1914.

17960	Corporal ..	McGuire, T.	4656	Private ..	Mathieson, G.
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## FROM BERMUDA, PER H.T. "SOMALI," MARCH 19, 1914.

1856	Corporal ..	Leaney, A. F.	1269	Private ..	Donovan, F.
18409	„ ..	Horsfield, F. M.			

## FROM MAURITIUS, PER S.S. "ALNWICK CASTLE," MARCH 17, 1914.

12965	Serjeant ..	Tyler, H. E.			
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## DEATHS.

5501	Private ..	Young, F. .. ..	17.3.14	Belfast	Meningitis.
149	„ ..	Coote, H. N. ..	24.3.14	Netley	Pneumonia.
7197	S.-Serjeant	Payne, F. .. ..	8.4.14	Leeds	Tuberculosis of lung.

**NOTES FROM EGYPT.**—Major T. J. Potter and Lieutenant and Quartermaster C. W. Kinsella write:—

**"MANŒUVRES IN EGYPT.**

"The Winter training season in Egypt was brought to a close during the middle of March by manœuvres carried out by all arms.

"On March 10 orders were received to mobilize a Section A, Field Ambulance, R.A.M.C., for combined training, the personnel to consist of Major T. J. Potter, R.A.M.C., O.C. Section; Captain H. V. Bagshawe, R.A.M.C., in charge tent sub-division; Captain P. G. M. Elvery, R.A.M.C., in charge of bearer sub-division; Lieutenant C. W. Kinsella, R.A.M.C., Quartermaster; with R.A.M.C., 35 N.C.Os. and men; 2nd Devons, 32 N.C.Os. and men; 3rd Dragoon Guards, 4 men (grooms); Signal Units, 2 men (signallers); also 2 native drivers, 9 riding horses, 2 mules, 2 riding camels, 42 baggage camels, and a desert ambulance cart—the latter designed by Colonel A. F. Russell, C.M.G., and previously described in the *ROYAL ARMY MEDICAL CORPS JOURNAL* for March.

"The outlying detachments joined at the Citadel, Cairo, on the evening of March 17, and were allotted their duties as laid down in the Field Service Manual A.M.S.

"The regimental bearers (band, 2nd Devon Regiment) were allotted to stretcher squads, there being 4 regimental and 2 R.A.M.C. men to each squad, the latter filling the posts of Nos. 2 and 4 bearers.

"All the personnel were armed with the short rifle. The usual ordnance and medical equipment was drawn.

"Rations for three days were carried—fresh meat and vegetables for the first two, and preserved meat with biscuit for the third.

"On the first day half the meat ration was served for breakfast (7 a.m.) and the remaining half, supplemented by cheese, issued as a haversack ration for consumption on the march. The usual tea was served in the evening at 8 p.m.; soup, prepared from the meat bones and thickened with pea-flour, proved very welcome in the open bivouac. On the second day a fresh meat stew was available, and another issue of soup, thickened by ration biscuit, proved very acceptable. Tinned extras were issued for the other meals. On the third day, preserved meat, cheese, and biscuit, with the balance of bread, was carried in haversacks. Three days' forage for horses and mules was also carried.

"The ordnance and medical stores, rations, fuel, water, etc., were distributed into thirty-four camel-loads, and following the system introduced at the last R.A.M.C. camp at Mena, each man was furnished with a brief résumé of his duties in camp, on the line of march, and in the field.

"A N.C.O. was placed in charge of each section of camels, with men to assist in loading and unloading (camel squads). The camels were numbered, and wore tallies showing their number and details of the load allotted to each.

"The section left the Citadel, Cairo, about 9.40 a.m. on March 18, and marched to Abbassia, where a halt was made for dinner, and from thence, about 1 p.m., moved out with the Khaki Force, along the Suez Road, till the 3rd signal tower (about fourteen miles from the Citadel) was reached, and where the force bivouacked for the night of March 19.

"On the following morning the order below was received:—

"Operation Order No. 3 by Major General the Hon. J. H. G. Byng, Commanding Khaki Force.

'Map. Egypt, 1/50,000.

'Rendezvous Hill,

'L. 9, March 19, 1914.

'(1) The Section Field Coy., R.E., and the Ammunition Column will move to Rendezvous Hill and take up position west of headquarters and await orders.

'(2) The Field Ambulance Section will be in position between No. 3 signal tower and the road in L. 9.

'(3) The 2nd line transport will remain in bivouacs until further orders.

'(Signed) A. McNALTY, *Captain (for G.S.O.)*.'

"The section moved off to the position allotted, where a dressing station, consisting of one operating tent, four tents G.S. India, 160 lb., for sick, and two tents, mountain service (one for pack store and one for general stores) were erected by the tent sub-division, bivouacs for personnel being also prepared.

"At 9.30 a.m. the bearer sub-division, under Captain Elvery, moved out with camel cacolets and desert cart, and between that hour and 2.5 p.m. collected thirty-eight tallied casualties from the two regimental aid posts which had been established by the medical officers with the 1st Worcesters and 2nd Gordon Highlanders respec-



tively. A signal post was established beneath the distinguishing flag, and communication kept up by heliograph and Morse code not only with the regimental aid posts in front but also through a chain of signal posts as far back as Cairo.

"The casualties on arrival at the dressing station were examined, treated and prescribed for, the A. and D. book, also A. B., 39 were kept going, and casualties' rations, supplemented by extras, were prepared in the trench kitchen. Arms, ammunition, etc., were handed into the pack store and recorded in A. B., 182. About midday the arrangements were inspected by the D.D.M.S. (Colonel M. Manders), and the G.O.C. (Major-General the Hon. J. H. G. Byng, C.B., M.V.O.), both of whom expressed their entire satisfaction.

"At 6.30 p.m. the following was received:—

'Operation Order No. 4 by Major-General the Hon. J. H. G. Byng, Commanding Khaki Force.

'Egypt, 1/50,000.

'Gordon Plateau,

'March 19, 1914.

'(1) The troops will halt and entrench the ground they have captured and no further advance will be made until to-morrow morning.

'(2) Each unit in the firing line will be responsible for its own protection.

'(3) The O.C. Worcester regiment will extend his left so as to get into touch with the right of the Gordon Highlanders.

'(4) At 2 a.m. 1 Company 1st Worcesters, and 1 Company 2nd Gordon Highlanders will assemble at headquarters with all equipment for demolishing and removing obstacles. The Section Field Company R.E. will report at the same time. The remainder of the Infantry will form up at 2.30 a.m.

'(5) The position of the R.H.A. will not be moved.

'(Signed) A. BLAIR,

'Major (for G.S.O.)'

"The section was held in readiness throughout the night, lamp signalling was established, and communication kept up with the regimental aid posts. The lamp (operating, F.A., acetylene) was kept going in the operating tent, and everything kept handy to meet the real casualties, it was thought might occur on this occasion owing to the dangers of night storming through wire entanglements, &c., but a beneficent Egyptian moon, coupled with the vigilance of the White Force defenders, rather negated the siege.

"At 8 a.m. on the 20th orders were received to return to Cairo, and the section reached their haven at the Citadel (after a weary and dusty march of 14 miles) about 3 p.m.

"Many lessons of much local value, which have been embodied in a separate official report, were learnt, but one which may be universally applied is the undoubted value of expert signalling.

"Morse code, helio., and night lamps were all used, and proved of the greatest service. There were no worn-out "gallopers," while semaphore would have been almost useless.

"Signallers, drawn from the Signal Units, supplemented by a field telephone would in most cases probably solve all the difficulties of intercommunication.

"Seeing that the bulk of the R.A.M.C. personnel had only recently joined from England and were consequently unused to desert work, their marching capacity was very good—none falling out.

"The regimental stretcher bearers (2nd Devons) worked splendidly, and showed they had not forgotten the lessons taught them when working in conjunction with the Royal Army Medical Corps at the last training camp.

"There being no operating tents in the country, a tent (lascar, store) with open ends was utilized, and proved very suitable. With the addition of an extra set of ridge and upright poles, either side (according to the prevailing wind) can be raised up to the level of the original ridge pole, giving ample space for all purposes.

"The tent, G. S., India, 160 lb., was tried for sick for the first time in this country, and although only 'single-fly,' proved quite satisfactory. It can accommodate six men on stretchers, or eight lying on the ground, while its weight renders it highly suitable for pack-mule, or camel transport.

"At the conference which followed the operations the G.O.C. explained that the idea was based on the knowledge we have been able to obtain of Kirk Kilisse, also on Skobeleff's attack on the Green Hills. He considered communication was extraordinarily good; one never seemed to be out of touch with anybody or anything.

"Colonel Lascelles (Worcesters), considered the signalling was very good.

"Colonel Uniacke (Gordons) thought wounded should be treated in their trenches until dark, and for this purpose a well-trained first-aid man should be with each platoon.

"General Byng concluded by saying that the work was excellent, and that everybody was excessively keen. The operations were as realistic as could be expected, and he had nothing but good to say of everyone."

**NOTES FROM DELHI.**—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant-Director, Medical Services (British Service), writes as follows, dated Delhi, March 26, 1914: "*Appointments.*—Surgeon-General Sir Arthur Sloggett, C.B., C.M.G., K.H.S., left for England on March 21, 1914, to take up his new duties as Director-General, Army Medical Service, and Surgeon-General W. Babbie, V.C., C.B., C.M.G., assumed the appointment of Director, Medical Services in India, on the same date.

"Colonel C. Birt assumed the duties of Assistant-Director of Medical Services (Bombay Brigade) with effect from March 5, 1914.

"*Leave.*—The grant of general leave to the undermentioned R.A.M.C. officers has been concurred in:—

"Lieutenant-Colonel W. L. Gray, six months from March 31, 1914.

"Lieutenant-Colonel H. E. Cree, six months from March 15, 1914.

"Major A. M. MacLaughlin, six months from May 1, 1914.

"Major W. H. S. Nickerson, V.C., privilege leave from April 9, 1914, to July 7, 1914, and general leave from July 8, 1914, to October 13, 1914.

"Captain C. T. V. Benson, six months from March 31, 1914.

"Captain A. Shepherd, six months from August 1, 1914.

"Captain D. T. McCarthy, six months from April 15, 1914.

"*Specialists.*—The following officers have been appointed specialists in the subjects noted against them:—

"Major S. O. Hall, Midwifery and Diseases of Women and Children, Burma Division.

"Captain A. T. Frost, Dermatology, 6th (Poona) Division.

"Lieutenant H. S. Blackmore, Prevention of Disease, Brigade Laboratory, Bangalore.

"Captain F. C. Lambert, Advanced Operative Surgery, 6th Division.

"Captain H. J. Crossley, Advanced Operative Surgery, 7th Division.

"*Transfers.*—The following transfers of officers have been ordered:—

"Captain D. P. Johnstone, from 5th to 2nd Division.

"Captain H. V. B. Byatt, from 6th to 4th Division.

"Lieutenant W. L. E. Fretz, from 3rd to 1st Division."

### **SPECIAL RESERVE OF OFFICERS.**

#### **ROYAL ARMY MEDICAL CORPS.**

The undermentioned officers resign their commissions: Lieutenant-Colonel Fred D. Wolley, dated March 21, 1914. Captain Samuel M. Sloan, dated April 25, 1914. Lieutenant George M. McCaul, M.D., No. 18 Field Ambulance, dated April 8, 1914.

The undermentioned to be Lieutenants (on probation): Cadet Robert Fausset Clarke, from the Edinburgh University Contingent, Officers Training Corps, dated February 17, 1914; Cadet Lance-Corporal Thomas Menzies, from the Aberdeen University Contingent, Officers Training Corps, dated March 9, 1914; Cadet Staff-Serjeant Robert Lister Horton, M.B., from the University of London Contingent, Officers Training Corps, dated March 13, 1914; Hubert Charles George Pedler, late Surgeon-Lieutenant, 1st Life Guards, and late Staff-Serjeant, University of London Contingent, Officers Training Corps, dated March 18, 1914; Cadet Corporal Ribton Gore Blair, from the Belfast University Contingent, Officers Training Corps, dated March 24, 1914; Cadet Thomas Warrington, from the London University Contingent, Officers Training Corps, dated March 25, 1914.

The undermentioned Lieutenants are confirmed in their ranks: George H. Haines, Howell G. Jones, Henry C. Rook.

## TERRITORIAL FORCE.

*4th (Hallamshire) Battalion, The York and Lancaster Regiment.*—Surgeon-Captain Duncan G. Newton, M.B., F.R.C.S.(Edin.), to be Surgeon-Major, dated January 23, 1914.

Surgeon-Lieutenant Christopher Addison, M.D., F.R.C.S., to be Surgeon-Captain, dated March 14, 1914.

## ROYAL ARMY MEDICAL CORPS.

*1st South Midland Mounted Brigade Field Ambulance.*—William Teulon Torrance, to be Lieutenant, dated March 1, 1914.

*2nd South Western Mounted Brigade Field Ambulance.*—Lieutenant Rupert Waterhouse, M.D., from the List of Officers attached to other Units, to be Lieutenant, dated February 9, 1914.

*1st Lowland Field Ambulance.*—Robert Scott Taylor, M.B., to be Lieutenant, dated February 19, 1914.

*3rd West Lancashire Field Ambulance.*—Major Archibald Gordon Gullan, M.D., F.R.C.S., from the 1st West Lancashire Field Ambulance, to be Lieutenant-Colonel, dated April 8, 1914. Major Elisha H. Monks resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated April 8, 1914.

*2nd Welsh Field Ambulance.*—The appointment of Lieutenant Charles W. C. Myles is amended to date January 7, 1914, and not March 25, 1914, as announced in our last issue.

*1st South Midland Field Ambulance.*—Henry Ernest McCready, M.D., to be Lieutenant, dated January 31, 1914.

*1st East Anglian Field Ambulance.*—Major Ernest V. Gostling to be Lieutenant-Colonel, dated April 8, 1914.

*2nd London (City of London) Field Ambulance.*—Lieutenant Leslie Rawes to be Captain, dated December 4, 1913.

*4th London Field Ambulance.*—Lieutenant Herbert E. Middlebrooke resigns his commission, dated April 4, 1914.

*5th London Field Ambulance.*—John Edward Sandilands, M.D. (late Captain, List of Sanitary Officers whose services will be available on mobilization), to be Lieutenant, dated April 4, 1914.

*1st Northern General Hospital.*—Quartermaster and Honorary Lieutenant Roden H. P. Orde resigns his commission, dated April 18, 1914.

*1st London (City of London) Sanitary Company.*—Lieutenant Joseph Grounds to be Captain, dated December 4, 1913.

## SANITARY OFFICERS WHOSE SERVICES WILL BE AVAILABLE ON MOBILIZATION.

Captain John E. Sandilands, M.D., resigns his commission, dated April 4, 1914.

*West Lancashire Clearing Hospital.*—Quartermaster-Serjeant Harry Garth Hunter, from the 3rd West Lancashire Field Ambulance, to be Quartermaster with the honorary rank of Lieutenant, dated April 8, 1914.

*Welsh Clearing Hospital.*—Captain Ashley Bird to be Major, dated March 28, 1912.

*South Midland Clearing Hospital, Royal Army Medical Corps.*—Bernard Grainger Goodwin, F.R.C.S. (late Lieutenant, Royal Army Medical Corps), to be Captain, dated December 4, 1913.

*2nd London Clearing Hospital.*—Lieutenant-Colonel Charles Monk, Retired List (late of the Indian Medical Service), to be Lieutenant-Colonel, dated March 6, 1914.

## OFFICERS ATTACHED TO OTHER UNITS.

Ernest Mannering Morris (late Captain, Unattached List for the Territorial Force), to be Lieutenant, dated March 20, 1914.

Captain William Ritchie, M.B., is seconded under the conditions of paragraph 114 of the Territorial Force Regulations, dated February 19, 1914.

Captain Arthur H. W. Hunt resigns his commission, dated April 14, 1914.

Richard Mervyn Wilson, M.D. (late Surgeon-Captain, Derbyshire Yeomanry) to be Captain, dated March 1, 1914.

Alfred John Gibson, M.B. (late Lieutenant, King Edward's Horse (the King's Oversea Dominions Regiment Yeomanry), to be Lieutenant, dated March 7, 1914.

Major Charles Thomson, retired list (late Indian Medical Service) to be Major, dated November 1, 1913.

Lieutenant Jacob F. Farrow to be Captain, dated March 6, 1914.

Captain John C. S. Burkitt, M.D., to be Major, dated April 8, 1914.

Captain Henry S. Walker, M.D., resigns his commission, dated April 8, 1914.

Lieutenant Arthur H. Burnett resigns his commission, dated April 22, 1914.

Hugh Miller Galt, M.B., to be Lieutenant, dated March 9, 1914.

Captain James B. Simpson, M.D., to be Major, dated March 11, 1914.

Samuel Macfarlane Sloan, M.B. (late Captain, Special Reserve, Royal Army Medical Corps), to be Captain, dated April 25, 1914.

#### SUPERNUMERARY FOR SERVICE WITH THE OFFICERS TRAINING CORPS.

Captain Norman Cecil Rutherford, M.B., F.R.C.S., from the Unattached List for the Territorial Force, to be Captain, for service with the University of London Contingent, Senior Division, Officers Training Corps, dated February 12, 1914.

### TERRITORIAL FORCE RESERVE.

#### ROYAL ARMY MEDICAL CORPS.

Charles Gordon Watson, F.R.C.S. (late Captain, List of Officers attached to other Units), to be Captain, dated February 13, 1914.

Captain Arthur T. Sissons, M.B., from the Unattached List for the Territorial Force, to be Captain, dated April 8, 1914.

Transport Officer and Honorary Lieutenant Joseph Cresswell Higman, from the 3rd Welsh Field Ambulance, to be Transport Officer, with the honorary rank of Lieutenant, dated April 18, 1914.

### QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

*Postings and Transfers.*—Sisters: Miss M. German, to Netley, on return from Egypt; Miss D. C. M. Michell, to Cairo, on arrival in Egypt; Miss J. Murphy, to Alexandria, on arrival in Egypt; Miss E. J. Minns, to Tidworth, from Royal Military Academy; Miss C. Mackay, to Royal Military Academy, Woolwich, from Devonport; Miss A. M. Pagan, to Devonport, from Netley; Miss L. M. Toller, to Netley, from Tidworth; Miss M. Clements, to Potchefstroom, on arrival in South Africa; Miss M. E. Harding, to Pretoria, on arrival in South Africa; Miss H. A. Hare, to Pretoria, on arrival in South Africa; Miss P. Steele, to Pretoria, on arrival in South Africa; Miss M. Pedler, to Chatham, on return from Egypt; Miss E. M. Lang, to Aldershot, from York; Miss G. A. Howe, to London, on return from South Africa; Miss C. W. Jones, to Aldershot, on return from South Africa; Miss A. B. Cameron, to York, from Aldershot; Miss E. St. Quintin, to London, from Dublin; Miss A. C. Mowat, to Aldershot, from London. Staff Nurses: Miss M. T. Casswell, to Devonport, from London; Miss E. M. Long, to London, from Devonport; Miss C. E. Bray, to Woolwich, on provisional appointment; Miss G. M. Taylor, to Tidworth, on provisional appointment; Miss D. F. Mudie, to Colchester, on provisional appointment; Miss G. C. Smith, to London, on provisional appointment; Miss A. H. Esden, to London, from Tidworth.

*Arrivals.*—Miss G. A. Howe, Sister, from South Africa; Miss C. W. Jones, Sister, from South Africa.

## ROYAL ARMY MEDICAL CORPS WARRANT OFFICERS' AND SERJEANTS', PRESENT AND PAST, ANNUAL DINNER CLUB.

THE Sixth Annual Dinner under the Presidency of the Director-General, Sir Launcelotte Gubbins, K.C.B., M.V.O., M.B., K.H.S., was held at Anderton's Hotel, Fleet Street, on April 15 last. Including the Club guests, Surgeon-General Sir A. Sloggett, Surgeon-General W. G. Macpherson, Lieutenant-Colonels A. A. Sutton and J. Thompson, and Major E. T. F. Birrell, 165 sat down to dinner. The menu was as follows :—

Clear Julienne	Chicken en Cocotte
Thick Ox Tail	Salad Rachel
Fillets of Soles, Mornay	Wine and Liqueur Jellies
Persillees Potatoes	Meringues Chantilly
Roast Sirloin of Beef, Yorkshire Pudding	Bombe Glacé
Roast Lamb. Mint Sauce	Wafers
Dauphin Potatoes. Peas.	Cheese and Dress
Cauliflower	Dessert

The Band, under the able conductorship of Bandmaster F. Bradley, rendered the following programme, which was thoroughly enjoyed.

<i>March</i> .. .. .	"Children of the Regiment" .. .. .	<i>Finck.</i>
<i>Valse</i> .. .. .	"The Girl from Utah" .. .. .	<i>Rubens.</i>
<i>Morceaux</i> .. .. .	{ "Je sais que tu es jolie" .. .. .	<i>Christine.</i>
	"You made me love you" .. .. .	<i>Monaco.</i>
<i>Selection</i> .. .. .	"The Marriage Market" .. .. .	<i>Jacobi.</i>
<i>Intermezzo</i> .. .. .	"Laughing Eyes" .. .. .	<i>Finck.</i>
<i>Valse</i> .. .. .	"My Little Grey Home" .. .. .	<i>Löhr.</i>
<i>Selection</i> .. .. .	"The Mikado" .. .. .	<i>Sullivan.</i>
<i>Two Step</i> .. .. .	"In my Harem" .. .. .	<i>Berlin.</i>

Before proceeding to the toast list, the Director-General announced that letters regretting their inability to attend had been received from Sir A. Keogh, Colonel W. H. Horrocks, and Lieutenant-Colonel E. M. Wilson, and that the Veterans Club had very kindly offered those present the honorary membership of that club during their stay in London. He also stated that there were nearly 200 members present on that occasion, and that the club had enrolled 49 new members during the past year.

"The health of the King," accompanied by the Band, having been duly honoured on the proposition of the Chairman :—

Serjeant-Major Huntingford then proposed "The health of the Chairman," and on behalf of the members present extended a most hearty welcome to Sir Launcelotte Gubbins and the other guests of the Club, and assured Sir Launcelotte of their unbounded satisfaction and pleasure in seeing him in the chair for the fifth time. He understood that this was the last time the members would see him there as Director-General, and assured him that the great assistance that he had always given them would never be obliterated from their memories. They hoped that his successor would have an equally warm corner in his heart for their club, and that he would extend to them the same assistance that Sir Launcelotte had always done. He pointed out that the position the club occupied at the present moment is, in a great measure, due to the assistance it has always received from the senior officers, and he felt sure that they might confidently look forward to a continuance of that support. He asked the members to rise and drink the health of the Chairman with musical honours.

Sir Launcelotte Gubbins, on rising to respond to the toast of his health, said it was satisfactory to find that their Dinner Club was in a flourishing condition. Not only had they a record gathering that evening, but forty-nine new members had joined during the past year. It was a great pleasure to find himself in the chair once more, more especially as owing to unavoidable absence abroad last time he had been unable to keep his engagement. Proceeding, Sir Launcelotte gave an amusing sketch of the life of a young officer at the time he entered the service forty-one years ago, and he could not help contrasting the conditions now with those that existed in bygone days. However, there were two men at that time at Netley of marked personality and to whom he could not help alluding—one was Professor Parkes, the father of hygiene, and the other Surgeon-General Graham Balfour, the P.M.O., who might justly

be styled the father of statistics. Statistics, which people sometimes kicked against, were the foundation of all reform, and in striking out any new line or devising any improvement, if we had no figures to go upon we were, so to say, beating the air. It might sometimes be asked whether we, as a corps, justified our existence and were worth the large sum of £437,000 which appeared in this year's estimates as the cost of the medical services of the army. Perhaps we were the last people who ought to answer that question, but, nevertheless, there was no getting away from facts and figures, and when it could be asserted that the admission, death, invaliding, and constantly sick ratios were about one-half what they were ten years ago, that would be sufficient answer to the most exacting critics. In dealing with the doings of the corps during the financial year ending March 31 last, he might mention that upwards of thirty officers and fifty-seven of other ranks were employed under the Foreign and Colonial Offices as well as the Egyptian Government; the posts held by "other ranks," included instructors, laboratory attendants, dispensers, sanitary inspectors, store-keepers, clerks, &c., on salaries ranging from £200 to £300 per annum. Following the enlightened policy of his predecessor he never refused any application for a particular individual, provided he was likely to do us credit and the appointment was such as he could take up without loss of dignity. He was influenced by the consideration that it was well for people to know that the R.A.M.C. was the channel for employment under external bodies; whilst the experience gained under varied conditions by all ranks was invaluable.

He was glad to say that during the past year, when certain branches of the army did so badly in the recruiting line, the R.A.M.C. maintained its popularity, so much so that they were enabled to raise the standard to 5 ft. 4 in., and later to 5 ft. 5 in.; he was also pleased to note that the gymnastic authorities at Aldershot considered our recruits amongst the most promising that came under their instruction. He had no hesitation in attributing the popularity outside to the admirable manner in which the depot was organized and commanded by Colonel Hunter and his able successor Colonel Sutton; he was able to speak on this subject with a certain amount of authority as he had inspected practically every depot in the United Kingdom during the past four years. The depot is to the recruit what the preparatory school is to the public school-boy: it is there the young soldier gets his first taste of military life, and his friends soon get to know whether he is well treated or the reverse; therefore too much importance cannot be attached to the selection of the staff.

It was also gratifying to be able to record a considerable increase in the number of men who had passed as compounders and gained nursing certificates, and best of all was the large increase in those who had obtained first-class certificates of education. He remembered speaking on this subject some few years back when matters in this direction were not so satisfactory, and it was encouraging to find the great improvement that had taken place. Setting aside the Household Cavalry, whose men are enlisted under special conditions, and those corps whose numbers are comparatively insignificant, the percentages of certificated men in the various arms of the service were according to the latest returns as follows: A.O.C. 94, R.G.A. 83, R.A.M.C. 82, Cavalry 78, R.H. and F.A. 78, R.E. 77, Infantry of the Line 75, Foot Guards, 74, A.S.C. 69; for the sake of simplicity decimals have been excluded. That was satisfactory as far as it went, but he saw no reason why the R.A.M.C. should not in time reach the educational standard of the A.O. Corps.

Coming to another aspect, which next to business he considered a very important one in life, he might fairly congratulate them all on their success in the world of sport. In steeplechasing, boxing, football (both Rugby and Association) they had more than held their own, whilst at the army athletic meeting and in relay races they had achieved some notable victories. He would specially like to mention the Boys' football team, which out of 18 matches played won 18 victories.

Sir Launcelotte, in conclusion, desired to remind them that this was the fifth occasion on which he had presided at their annual gathering. He had endeavoured to prove to them that they belonged to a corps which could compare physically and intellectually with any in the British Army, and he possessed unusual opportunities of judging; that they agreed with him was evidenced by the fact that those who were fathers of families sent their sons *en bloc* into the corps, where they formed the best stamp of recruit, and in the general interest he trusted they would continue to do so. In a very short time he would hand over the duties of director-general to his successor, Sir Arthur Sloggett, to whom he was sure they would all extend the same loyalty and co-operation that he had experienced, and in days to come when he might recall various incidents in his active military career, there were none that he would dwell on with greater pleasure than those nights when he acted as their chairman and enjoyed their



hospitality. He begged to thank most sincerely Serjeant-Major Huntingford and the members of the club for the cordial manner in which they drank the toast of his health.

Serjeant-Major Cox then proposed the toast of "The Visitors," and expressed the pleasure the members of the club felt that night in being honoured by the presence of so many distinguished guests. He cordially welcomed them on behalf of the club, and hoped that their presence there would further consolidate the good feeling which always exists between the officers and serjeants of the Corps. He coupled the toast with the names of Sir A. T. Sloggett and Lieutenant-Colonel J. Thomson.

Surgeon-General Sir A. T. Sloggett, in responding to the toast of "The Visitors," thanked the members most cordially for the way in which they had honoured the toast, and expressed the pleasure he felt at attending such a delightful gathering after having just returned from abroad. He assured them that his one endeavour would be to carry on the traditions of his predecessors, and he hoped that this most excellent club would go on in the way in which it had during the last six years.

Lieutenant-Colonel J. Thomson also responded, and wished the club every success in the future.

## EXAMINATIONS.

The following questions given at recent examinations are published for general information :—

### QUARTERMASTER-SERJEANTS.

Para. 285, (b) (1)

(1) Give the detail for forming line facing in the same direction as the column, from company column.

(2) Give the position of the various details of a field ambulance in column by the right.

(3) State the number of the various kinds of carts and wagons in a field ambulance and a cavalry field ambulance.

(4) What is the object of a divisional collecting station? What are the main points to be taken into consideration in choosing a site for it? Where does the medical personnel for it come from?

(5) You are with a field ambulance on active service that is forced by the military situation to undertake the temporary rôle of a stationary hospital. As quartermaster-serjeant of the unit, state what measures you would consider necessary to adopt to provide for the efficient sanitation of the camp.

(6) What is a clearing hospital? Of what is its transport composed, and where is it obtained?

(7) Give the words of command necessary for the collection of wounded, and state by whom they will be given (N.B.—Words of command up to the lifting of the loaded stretcher not required).

(8) Give the words of command and detail necessary for changing the direction of a squad to the right when on the move.

Para. 285, (b) (2)

(1) Give a short account of the special duties of the warrant officer in mental wards, with reference to: (1) seclusion of violent patients. (2) observation of patients.

(2) To what section of a field ambulance is the serjeant-major attached? Who performs his duties in the other sections when the sections are separated?

(3) How are patients in a field ambulance dieted?

(4) How are offences recorded on field service?

(5) What additional duties does the senior non-commissioned officer perform in a hospital in which there is no quartermaster?

(6) How does the steward account for diets and extras and all supplies received and issued?

(7) How are the arms and equipment of patients brought to a field ambulance disposed of?

(8) What will the warrant officer or senior non-commissioned officer of a hospital do in the event of any case of illness or accident, etc., being brought into his hospital?

Para. 285, (b) (3)

(1) How is mobilization clothing stored? How is it turned over?

(2) When is the clothing ledger balanced? How is the stock verified, and how is the ledger disposed of?

(3) When a soldier of the R.A.M.C. is placed under orders for foreign service, what steps would you take to procure articles of clothing required for wear at the station

named? When are badges for same supplied, and how are charges for fitting and marking such garments adjusted?

(4) You are ordered to arrange for tentage and equipment for a standing camp; what vouchers would be prepared in drawing and returning same and how should losses be adjusted?

(5) How are personal clothing and necessities worn out by fair wear replaced on active service?

(6) State the arrangements of a reservist's kit in its pigeon-hole. What cards should be with each kit, and what do they record?

(7) Describe the articles of accoutrements issued to the various ranks of the R.A.M.C. in peace and war.

(8) What are the regulations regarding storage of clothing for special reservists for the mobilization of medical units?

Para. 285, (b) (4)

(1) How often and by whom should mobilization medical stores be checked?

(2) How are the following medical stores accounted for :—

(a) Instruments lost and chargeable.

(b) Glass articles lost and chargeable.

(c) Glass articles broken accidentally.

(3) State how transactions in general medical stores are recorded. What supports the ledger entries and when are they produced?

(4) What are the orders in regard to reserve stores of medicines in military hospitals?

(5) State briefly the object in establishing: (a) base depot of medical stores: (b) advanced depot of medical stores.

(6) State the procedure in regard to local purchase of medicines on active service.

(7) How are supplies of medicines obtained for a medical store? What is the store book of a medical store? What is a "transfer return"?

(8) What are the regulations governing issues of medical stores to the navy at stations abroad?

Para. 284, (b) (1)

#### STAFF-SERGEANTS.

(1) A man of the corps wishes to extend his service to seven years. State (a) conditions; (b) how carried out; (c) what entries are made in his attestation sheet.

(2) Enumerate all the documents to be prepared or completed in carrying out the transfer to the reserve of a man who bears a "very good" character and who wishes to be registered for civil employment.

(3) What procedure is adopted to prevent the improper use of army form B. 2067, i.e., the character certificate?

(4) (a) What do you understand by premature transfer to the army reserve? (b) In what circumstances may premature transfer to the army reserve be sanctioned?

(5) In recording the following entries in statement of services, what special data have to be included :—

(1) Extension of service with colours.

(2) Continuance after twenty-one years.

(3) Conviction of court-martial.

(4) Transfer for service under colonial government.

(5) Reckoning of former service for pension purposes.

Para. 284, (b) (2)

(1) What are the regulations for keeping the cash book, Army Book 69? On what date should the pay and mess book be rendered to the paymaster?

(2) What are the regulations for forfeiture of good conduct badges and how can they be regained?

(3) What are the regulations regarding the refund of purchase-money?

(4) When a soldier is transferred to the reserve, what is the procedure necessary to ascertain the balance due to the man?

(5) What is "service pay," and under what conditions is it issued to soldiers of the R.A.M.C. who enlisted before October 1, 1906?

Para. 283, (b) (1)

#### SERGEANTS.

(1) Give the words of command and detail for the following :—

(a) Saluting to the front by numbers.

(b) Forming fours and forming two-deep by a squad: (1) at the halt; (2) when in file on the march.

(c) Give the detail for "about turn."

(2) (a) Give the regulations for units marching in fours on a road, while marching and during halts.

(b) How would you test whether a company, moving in fours on the parade ground, is marching properly?

(3) You are in command of a section of men who require to :—

(a) Cross a stream 3 ft. deep ;

(b) Pass over 100 yards of rocky ground, and

(c) Pass through a narrow defile 2 miles long. What orders or directions would you give?

(4) Describe the formation known as "company column." When the company is in this formation, describe the proper position of the company commander, the subalterns, and the section commanders.

Para. 283, (b) (2)

(1) Describe exactly how a field ambulance should be drawn up "in column of route."

(2) You have four loaded stretchers under your command, and you are ordered to place the wounded men in an ambulance wagon 50 yards away. Give the words of command to accomplish this, stating who gives them, and state also in what order the compartments of the wagon are loaded.

(3) Six stretcher squads, four bearers in each, are marching in extended order with closed stretchers. What happens on the command "On No. 2 squad—close"?

(4) Give the words of command and the necessary detail for making the "hook-grip seat."

Para. 283, (b) (3)

(1) You are in charge of a barrack room and Private "B" attempts to commit suicide; what steps will you take?

(2) How is concealment of venereal disease legislated for?

(3) What is meant by "military custody" in the case of :—

(a) A non-commissioned officer (not under sentence)?

(b) A private soldier (not under sentence)?

(4) What are the regulations governing soldiers' dealings with contractors?

Para. 283, (b) (4)

(1) In what circumstances are charges for washing rooms and passages made against troops on handing or taking over barracks?

(2) How can you find out the amount of equipment in your barrack room, and what takes place in regard to accounting when the equipment is changed, and by whom?

(3) In the event of an unusual occurrence happening in or near a guard, what ought commanders immediately to do?

(4) What are the duties of the non-commissioned officer who accompanies the sick to hospital? What kit does a sick soldier take to hospital?

Para. 283, (b) (5)

(1) In a standing camp for ten days describe the shallow-trench system required for an infantry battalion?

How would you know if any ground in your camp had recently been used for latrine purposes?

(2) What accommodation on active service in billets have officers and men a right to expect?

What is meant by "close billets"?

(3) What do you consider the best time to start a march? State your reasons.

What is a good average day's march for infantry? What factors affect this?

At what rate does an infantry division usually travel?

(4) A young soldier is ordered out on manoeuvres and comes to you for advice. State briefly the points you would impress upon him.

Para. 283, (b) (6)

(1) How would you treat a case of suffocation from inhaling steam?

(2) What is your procedure in replacing the following breakages or deficiencies in a ward?

(a) Wash hand basin, (b) unserviceable catheter, (c) medicine glass, (d) fomentation flannel, (e) one boot belonging to a patient.

(3) You are wardmaster in charge of the mental ward and a case is admitted with supposed suicidal tendencies. State briefly what you would do and what instructions you would give to the orderlies under you.

(4) You are a steward. What returns should be sent to the officer in charge of supplies and through what channels are they transmitted?

Para. 280, (e) (1) **CORPORALS.**

(1) Give the amended nomenclature for the following:—

- (1) Prisons.
- (2) Barrack cells.
- (3) Prisoner at large.
- (4) Guard-room cells.
- (5) A soldier after being sentenced by a commanding officer.

(2) What are the principles which must guide a non-commissioned officer in his dealings with his brother non-commissioned officers and private soldiers in giving orders, imparting instruction, and on all other occasions?

(3) What are the rules regarding the borrowing of clothing and equipment amongst soldiers? (b) Why are such rules necessary?

Para. 280, (e) (2)

(1) How would you cleanse (a) a hair brush, (b) sink taps, (c) cooking pots?

(2) What are the duties of a non-commissioned officer of a guard when a man in close arrest for drunkenness states he wishes to see a medical officer?

(3) You are a non-commissioned officer in charge of a piquet at the depot. What are your orders?

Para. 280, (e) (3)

(1) You are the non-commissioned officer in command of a detachment, and arrive at a town where there are no barracks. How would you obtain billets?

(2) Describe how you would prepare the field-service filter water-cart for use.

(3) On arrival in camp you are detailed to supervise the arrangements for: (1) Drinking water, (2) washing places, (3) cook-houses, (4) latrines. In doing this what particular points would you look to in each case?

Para. 280, (e) (4)

(1) Explain the duties of the attendant in charge of the dining hall with regard to the diets, and how these diets will be accounted for? To what section of the Corps does the attendant of the dining hall belong?

(2) An unconscious patient is admitted to your ward who is in possession of 2s. 6d. and a watch. (a) What are your duties in regard to these, and (b) as to his equipment?

(3) What is the order regarding the wearing of chevrons by non-commissioned officers while patients in hospital?

Para. 280, (e) (5)

(1) How would you prepare and load a country cart for the transport of wounded on stretchers?

(2) How would you carry the following cases on a stretcher downhill: (a) Compound fracture of right thigh. (b) Severe wound of head. (c) Severe wound of right side of thorax?

(3) Describe any two of the following: (a) An improvised sack-stretcher; (b) an improvised coat stretcher; (c) an improvised rifle-stretcher.

Para. 280, (e) (6)

(1) How would you render aid to a case of: (a) Fractured pelvis; (b) severe hæmorrhage from the palm of the hand?

(2) Describe the first aid treatment of a fracture of the skull.

(3) State on what occasions artificial respiration is necessary and describe what you would consider the best method of performing it.

Para. 280, (e) (7)

(1) What are the sources of impurities in a surgical ward?

(2) What do you consider a good test for ventilation?

(3) What do you understand by "outlets" and "inlets"? Give an example of each.

Para. 280, (e) (8)

(1) What special instruments are required for: (a) Tracheotomy; (b) fracture of the skull; (c) scraping out diseased lymphatic glands?

(2) What are the following instruments used for: trephine, bistoury, laryngoscope, director, cystoscope, probang, truss, insufflator?

(3) Mention the things contained in the medical companion which are not in the surgical haversack, and the things contained in the surgical haversack which are not in the medical companion.

# ROYAL ARMY MEDICAL COLLEGE.

LIST OF BOOKS ADDED TO THE LIBRARY DURING THE MONTHS OF  
JANUARY, FEBRUARY, AND MARCH, 1914.

Title of Work and Author	Edition	Date	How obtained
Baumgarten's <i>Jahrbericht</i> for 1910. 2 vols ..		1913	Library Grant.
<i>Handbuch der pathogenen Mikro-organismen.</i> By Kolle and Wassermann. Vol. ii, Parts I and II, and Vols. iii to viii.	2nd	1912-13	" "
Allen's <i>Commercial Organic Analysis.</i> Vol. viii. Edited by Davis and Sadtler	4th	1913	" "
Elements of Bacteriology. By Prescott and Winslow	3rd	1913	" "
E. Merck's Annual Report on Recent Advances in Pharmaceutical Chemistry and Therapeutics, 1912. Vol. xxvi		1913	Editor, Journal.
On the Hygienic Management of Labour in the Tropics. By P. M. Gerrard		1913	" "
<i>Sanitätstaktisches Handbuch.</i> By Wallenstorfer and Szarewski		1914	" "
Treatment of Rheumatic Infections. Parke, Davis and Co.		1913	" "
War and Women, from Experience in the Balkans and Elsewhere. By Mrs. St. Clair Stobart		1913	" "
Statistical and General Report of the Army Veterinary Service for 1912		1913	" "
Protein and Nutrition. By Dr. M. Hindhede ..		1913	" "
Service Memories. By Surg.-Gen. Sir A. D. Home, V.C., K.C.B. Edited by C. H. Melville, Lieut.- Col., R.A.M.C.		1912	" "
Health and Empire. By Francis Fremantle ..		1911	" "
Guide to the Microscopic Examination of the Eye. By Professors Greeff, Stock, and Wintersteiner. Translated by H. Walker, M.A., M.B.		1913	" "
Smallpox and its Diffusion. By A. Collie, M.D. ..		1912	" "
Hazell's Annual for 1914. Edited by T. A. Ingram, M.A.		1914	" "
Hygiene and Public Health. By Parkes and Kenwood	5th	1913	" "
Lessons in Elementary Tropical Hygiene. By Henry Strachan, C.M.G.		1913	" "
The Dietetic Treatment of Diabetes. By Major D. B. Basu, I.M.S.	4th	1913	" "
Ionic Medication. By H. Lewis Jones, M.D. ..	2nd	1914	" "
Field Sanitation for Territorial Officers. By Lieut.- Col. C. Averill, V.D.		1913	" "
<i>Kurzes Lehrbuch der Militar-Hygiene.</i> Von Dr. Jaroslav Hladik		1914	" "
Electro-Pathology and Therapeutics. By Baines and Bowman		1913	" "
The Sanitary Inspector's Handbook. By A. Taylor	5th	1914	" "
The Depot for Prisoners of War at Norman Cross, Huntingdonshire, 1796 to 1816. By Thomas James Walker, M.D.		1913	" "
A Textbook of Medicine. By G. Dieulafoy. Trans- lated by Collins and Liebmann. 2 vols	2nd	1912	" "
Guy's Hospital Reports. Vol. lxxvii ..		1913	" "
Transactions of the British Pathological Society for the year 1913. Edited by W. S. Handley		1914	" "
Tropical Medicine and Hygiene. By C. W. Daniels. Part I: Diseases due to Protozoa	2nd	1913	" "

LIST OF BOOKS ADDED TO THE LIBRARY—*Continued.*

Title of Work and Author	Edition	Date	How obtained
Report of the Surgeon-General, United States Army Mind and its Disorders. By W. H. B. Stoddart, M.D.	2nd	1913	Editor, Journal.
		1912	" "
Alimentary Toxæmia: its Sources, Consequences, and Treatment. A Discussion opened by W. Hale White, M.D.		1913	" "
Scrofulosis. By Prof. Dr. G. Comet. Translated by J. E. Bullock		1914	" "
Catalogue of Naval Manuscripts in the Library of the Royal United Service Institution. Compiled by Capt. H. Garbett, R.N.		1914	" "
Calendar of Military Manuscripts in the Royal United Service Institution. Compiled by Sir Lonsdale Hale		1914	" "
Alimentary Enzymes in Theory and Application, with special reference to their use in Treatment and Dietetics. Benger's Food, Ltd.		1912	" "
Modern Anæsthetics. By J. W. Silk, M.D.		1914	" "
The Dangers of Syphilis and the Question of State Control. Discussion at the International Congress of Medicine, August, 1913		1914	" "
Report on the Health of the Army for the year 1912		1913	Commandant's Office.
Report on the Prevention of Malaria in Cyprus. By Sir Ronald Ross, K.C.B., F.R.S.		1914	" "
Royal Army Medical College, Junior Course, Examination Papers from November, 1902, to December, 1907			" "
Local Government Board Report. Supplement containing the Report of the Medical Officer for 1912-13		1914	" "
Nairobi Laboratory Report. Vol. iii. Part I. By Small and Kirkham		1913	" "
Do. Do. Vol. iii. Part II. By Ross and Kirkham			
Transactions of the Congress of American Physicians and Surgeons. Vol. ix		1913	" "
Second Report on Malaria in Bengal. By Major A. B. Fry, M.D., I.M.S.		1914	" "
Modern Problems in Psychiatry. By Ernesto Lugaro. Translated by D. Orr, M.D., and H. G. Rows, M.D.			The Victoria University of Manchester.
Autograph Letters from Bt. Lieut.-Col. C. E. Gordon and Staff Asst.-Surg. Moffitt, 1865-68			Surgeon-General Babbie, V.C.
Medical Education in the United States and Canada. A Report to the Carnegie Foundation for the Advancement of Teaching. By A. Flexner. Bulletin No. 4		1910	Librarian to the Board of Education.
Archives of the Middlesex Hospital. Clinical Series, No. 13		1913	Middlesex Hospital.
Blackwater Fever in the African Dependencies. Reports for 1912		1914	War Office.
Year-Book of the Royal Society		1914	Royal Society.
London County Council. Annual Report of the Council, 1912. Vol. iii: Public Health			The Clerk of the Council.



LIST OF BOOKS ADDED TO THE LIBRARY—*Continued.*

Title of Work and Author	Edition	Date	How obtained
A Handbook of Hygiene. By Lieut.-Col. A. M. Davies, R.A.M.C. (Ret.), and Col. C. H. Melville, R.A.M.C.	4th	1913	Presented by the Authors.
A System of Syphilis. Edited by Power and Murphy. Vol. vi.		1910	Presented by Lieut.-Col. M. W. Russell, R.A.M.C.
Hygiene and Diseases of India. By Lieut.-Col. P. Hehir, I.M.S.	3rd	1913	Presented by the Publishers, Messrs. Higginbotham, Ltd.
Transactions of the Royal Academy of Medicine in Ireland. Vols. xxix and xxx		1911-12	Presented by Col. C. Birt.
Elementary Text-book of Zoology. Special Part: Mollusca to Man. By Dr. C. Claus. Translated and edited by Sedgwick and Heathcote		1885	Presented by Capt. A. C. Amy, R.A.M.C.
Anatomical Plates of the Nerves. Edited by Jones Quain, M.D., and W. J. E. Wilson		1889	" "
The Muscles of the Human Body. No title-page.. Letter-, Word- and Mind-Blindness. By James Hinshelwood, M.A., M.D.		1900	" "
Transactions of the Medico-Chirurgical Society of Glasgow. Vols. ii, iii, and iv		1900-04	" "
An Atlas of Practical Elementary Biology. By G. B. Howes		1885	" "
Diseases of the Joints. By Howard Marsh ..		1886	" "
Insanity and Allied Neurosis. By G. H. Savage, M.D.	2nd	1886	" "
The Harveian Oration on the Influence of Harvey's Work in the Development of the Doctrine of Infection and Immunity, October 18, 1913. By J. Mitchell Bruce, M.A., M.D.			Presented by the Author.
The Geographical Journal, December, 1913, to March, 1914			Presented by Col. R. J. S. Simpson, C.M.G., (Ret.).
A Journal of the Siege of Gibraltar, 1779-83. By Captain Spilsbury, 12th Regiment. Edited by B. H. T. Frere, Hon. Librarian of the Gibraltar Garrison Library		1908	Presented by Major H. A. L. Howell, R.A.M.C.
Medical Register Book of Surgeon John Francis Smet, 8th Light Dragoons, 1810-18			Presented by Miss Thorburn, 144, Bedford Street, Liverpool.
Case Book of Surgeon John Francis Smet, 8th Light Dragoons. Commencing 1819			" "
Letter Book of Surgeon John Francis Smet, 8th Light Dragoons. Commencing 1815			" "
Do. Do. Commencing January 1, 1819			" "
Meteorological Observations, 1816-17 (India) ..			" "

## ROYAL ARMY MEDICAL CORPS OFFICERS' BENEVOLENT SOCIETY.

THE Annual General Meeting of the subscribers to this Society will be held in the Library of the Royal Army Medical College, Grosvenor Road, S.W., at 3 p.m., on Monday, June 15, 1914. The Director-General will preside.

It is hoped that officers will freely express their views on any point connected with the Society. Subscribers who wish for information on any special point are requested to communicate with the Secretary, so that information may be furnished in response to any question asked.

124, Victoria Street, S.W.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*  
*Secretary.*

## ROYAL ARMY MEDICAL CORPS FUND.

NOTICE OF THE TWELFTH ANNUAL GENERAL MEETING, 1914.

THE Annual General Meeting of the subscribers to this Fund will be held in the Library of the Royal Army Medical College, Grosvenor Road, S.W., at 2 p.m., on Monday, June 15, 1914. The Director-General will preside.

It is hoped that officers will freely express their views on any point connected with the Fund. Subscribers who wish for information on any special point are requested to communicate with the Secretary so that information may be furnished in response to any question asked.

124, Victoria Street, S.W.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*  
*Secretary.*

## ANNUAL DINNER.

THE Annual Dinner of the Officers of the Royal Army Medical Corps will take place on Monday, June 15, 1914, in the "Empire and Alexandra Rooms," Trocadero Restaurant, Piccadilly Circus, W., at 8 o'clock. *President:* The Director-General, Army Medical Service.

The price of dinner tickets to subscribers will be 7s. 6d. The price to non-subscribers will be £1 12s. 6d. It is particularly requested that early application for tickets be made, both by subscribers and non-subscribers, in order that the number attending may be approximately known as soon as possible. Non-subscribers when applying for tickets should forward the sum of £1 12s. 6d. by cheque or P.O.O., made payable to the Hon. Secretary. The price of the dinner ticket will be collected from subscribers at the restaurant on the night of the dinner.

The following officers will be regarded as subscribers:—

(1) All existing subscribers to the old Royal Army Medical Corps Dinner Fund, provided they have paid their subscriptions to that fund for this year.

(2) All subscribers to the Royal Army Medical Corps Fund,<sup>1</sup> provided their subscriptions are credited to the fund before the date of the dinner.

Selected musicians from the Royal Army Medical Corps Band will perform during dinner.

Besides one long table there will be small separate tables to allow of eight officers sitting at each, and these will be reserved for parties of eight officers who wish to dine together, if they will arrange to notify the names to the Hon. Secretary before Thursday, June 11.

A plan of the tables will be on view at the restaurant on the day of the dinner, in order that officers who have not made up parties may select the places at which they

<sup>1</sup> Officers who have especially excluded the annual dinner in the allocation of their subscription will of course be excepted.

wish to sit. A list of officers who have notified their intention of dining will also be on view.

N.B.—The Monday in Ascot Week has been fixed as the day on which the dinner will be held each year. Miniature medals will be worn.

G. B. STANISTREET, *Lieut.-Colonel, R.A.M.C.,  
Hon. Secretary R.A.M.C. Annual Dinner Committee,*

*c/o Messrs. Holt and Co.,  
3, Whitehall Place, S.W.*

## ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON MONDAY,  
APRIL 20, 1914.

### *Present.*

Surgeon-General Sir Launelotte Gubbins, K.C.B., M.V.O., K.H.S., Director-General, in the Chair.

Surgeon-General W. G. Macpherson, C.M.G.

Colonel A. Peterkin.

Colonel B. Skinner, M.V.O.

Colonel E. H. Lynden-Bell.

Lieutenant-Colonel W. W. Pope.

Lieutenant-Colonel E. M. Pilcher, D.S.O.

Captain T. J. Wright.

Captain W. Benson.

(1) The Minutes of the last Meeting were read and confirmed.

(2) It was noted that the following grants were received from Companies for the General Relief Fund during the quarter ending March 31, 1914.

Aldershot	..	..	..	£80	0	0
Woolwich	..	..	..	2	10	0
Curragh	..	..	..	3	2	0
Potchefstroom	..	..	..	5	0	0

£90 12 0

(3) A sum of £35 10s. was sanctioned for grants made from the General Relief Fund for the past quarter. A list of recipients is appended to these proceedings.

(4) The Aldershot Band Accounts were considered and passed and are attached hereto. A sum of £100 was voted towards the current quarter's expenses.

(5) Surgeon-General W. G. Macpherson, C.M.G., was appointed a member of the Memorial Sub-Committee, *vice* Surgeon-General W. Babbie, V.C., C.B., C.M.G. This Sub-Committee is now constituted as follows:—

Surgeon-General W. G. Macpherson, C.M.G.

Colonel B. Skinner, M.V.O.

Lieutenant-Colonel W. W. Pope.

(6) A sum of £7 4s. was sanctioned for the payment of ten engravings of distinguished army medical officers, purchased by the Memorial Sub-Committee. It was resolved to leave the framing of these engravings to the Sub-Committee.

(7) The Report and Accounts of the Dinner Sub-Committee attached hereto were approved and adopted.

(8) A correspondence emanating from the Duke of Wellington asking for a donation towards the Fund now being raised for the preservation of the battle-field of Waterloo, was read and considered. It was proposed by Lieutenant-Colonel Pope, seconded by Colonel Lynden-Bell, and resolved that a sum of twenty-five guineas be given—the grant being allocated under the head of Memorials.

(9) Colonel E. Butt was elected a member of this Committee, *vice* Surgeon-General W. Donovan, C.B., whose four years' tenure has expired. Major W. R. Backwell was also elected a member *vice* Major Fell.

(10) A letter was read from the United Services' Employment Association, Liverpool, asking for a further donation. It was resolved that a donation of £2 2s. be granted from the General Relief Fund.

(11) With reference to Minute 7 of the Proceedings of the Committee held on October 15, 1913, it was resolved to sanction the payment of premiums on the insurance policies of memorials, etc., added to the chapel of the Queen Alexandra Military Hospital, since the insurance was effected in June, 1912. Authority was now given for the policies to be increased if necessary up to £50 for windows and £100 for memorials.

(12) The report of the Sub-Committee appointed at the last meeting to consider whether the R.A.M.C. Fund could pay the subscriptions of the officers and men to the Army Athletic Association was read. It was to the effect that there was no fund available at present from which subscriptions could be drawn, and that the matter should be referred to the Central Mess and Games Committee. It was suggested that the Central Mess and Games Committee should bring up the question at their annual meeting. (Report attached.)

(13) With reference to Minute 5 of the last meeting, with regard to the number of officers (188) on the active list of the Corps who did not subscribe to the R.A.M.C. Fund last year, it was resolved that a printed letter be sent from the Committee, signed by the Secretary, to each of those officers, asking him to become a subscriber to the Fund, and pointing out the objects and advantages of the Corps Fund, also that each individual officer of the Corps gets the credit of supporting all charities, etc., to which the Fund gives donations and subscriptions.

(14) In view of the fact that several officers stop their subscriptions to the Fund, the Committee resolved to submit the following resolution to the Annual General Meeting for its consideration: "That any officer stopping his subscription to the Corps Fund shall not be eligible to attend the dinner at the subscriber's rate until his back subscriptions are fully paid."

(15) Colonel Skinner having asked a question, whether votes for the Bath School may be given to children of officers of the Indian Army as well as to those of the British Service, his attention was invited to the report of the Sub-Committee, as approved and adopted by the Committee, that the votes of the Fund should only be given to candidates of the British Service. Moreover, it was pointed out that as there has always been a plethora of candidates coming under the latter category, the question of voting for the children of officers of the Indian Army was a contingency never likely to arise.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*

124, Victoria Street, S.W.

*Secretary.*

## ROYAL ARMY MEDICAL CORPS FUND.

### LIST OF RECIPIENTS OF GENERAL RELIEF FOR THE QUARTER ENDING MARCH 31, 1914.

Name	Age	District	Grant	Total	Remarks
Mr. T. G. A. ..	61 ..	London ..	£2 ..	£7 ..	.. Partial destitution.
Mrs. B. A. ..	36 ..	Woolwich ..	3 ..	3 ..	.. Four children to support.
Mr. F. H. ..	49 ..	London ..	10s. ..	4 ..	.. Out of work.
Corp. G. P. ..	— ..	Aldershot ..	£3 ..	3 ..	.. Special treatment for child.
Mr. J. R. J. ..	39 ..	Portsmouth ..	4 ..	4 ..	.. Suffers from malignant disease.
Mrs. M. A. L. ..	32 ..	London ..	4 ..	14 ..	.. Ill-health and partial destitution.
Mr. H. J. N. ..	51 ..	Colchester ..	4 ..	9 ..	.. Partial destitution, suffers from hernia.
Mrs. C. B. ..	33 ..	Woolwich ..	4 ..	8 ..	.. Destitution.
Mrs. J. I. ..	— ..	Malta ..	4 ..	4 ..	.. Destitution.
Mrs. F. G. S. ..	36 ..	Aldershot ..	4 ..	4 ..	.. Destitution.
Mrs. W. A. B. ..	32 ..	Colchester ..	3 ..	3 ..	.. Suffers from tubercle.

# THE ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

FIRST QUARTER ENDING MARCH 31, 1914.

CREDIT.		DEBIT.	
	£ s. d.		£ s. d.
By Balance brought forward	1 12 2	To Band Pay, First Quarter, 1914	45 19 1
" Grant, R.A.M.C. Fund..	110 0 0	" Bandmaster's Salary	30 0 0
" Aldershot Officers' Subscriptions, December, 1913..	6 0 0	" Cost of Oboe	12 0 0
" " " " " January, 1914..	5 10 0	" " Light	1 16 8
" " " " " February, 1914..	4 10 0	" " Cello Case	1 4 0
" Two Subscriptions (H. H. Stokes and W. W. Tomlison)	0 10 0	" Cash Account	5 0 0
		" Cost of Music and Repairs to Instruments	15 11 8
		" Stationery (Gale and Folden)	1 18 3
		" Master Tailor's Bill	3 6 6
		" Cost of Clarinet	8 0 8
		" " Cheque Book	0 4 2
		" Credit Balance	3 1 2
	<u>£123 2 2</u>		<u>£128 2 2</u>

Audited and found correct (Signed) G. B. RIDDICK, Major, R.A.M.C., President.  
A. D. O'CARROLL, Captain, R.A.M.C. } Members.  
W. E. C. LUNN, Captain, R.A.M.C. }

ESTIMATE FOR QUARTER ENDING JUNE 30, 1914.

	£ s. d.		£ s. d.
By Credit Balance	3 1 2	To Estimated Expenditure under all heads	120 0 0
" Estimated Aldershot Subscriptions	17 0 0		
Probable grant required	100 0 0		
	<u>£120 1 2</u>		<u>£120 0 0</u>

Aldershot,  
March 27, 1914,

(Signed) WALLACE BENSON, Captain R.A.M.C.,  
Band President.

**REPORT FOR SUBMISSION TO THE GENERAL COMMITTEE, ROYAL  
ARMY MEDICAL CORPS FUND.**

**MEETING OF THE DINNER COMMITTEE AT THE WAR OFFICE ON FEBRUARY 25, 1914.**

The Committee, R.A.M.C. Dinner Fund, report as follows :—

(1) The dinner in 1913 was held at the Trocadero Restaurant on June 16, when 217 past and present officers of the Corps attended.

(2) It was decided that the dinner this year be held at the Trocadero Restaurant on June 15, at 8 p.m.

(3) They recommend that the charge for tickets to subscribers be 7s. 6d. and to non-subscribers 32s. 6d., a grant being voted from the R.A.M.C. Fund to defray the balance.

(4) The following officer has been nominated to represent Netley on the Dinner Committee :—

Major J. R. McMunn, *vice* Major D. Lawson.

(5) The number of officers subscribing to the old Dinner Fund in 1913 was thirty.

**REPORT OF SUB-COMMITTEE OF R.A.M.C. FUND COMMITTEE RELATIVE  
TO THE ARMY ATHLETIC ASSOCIATION.**

*Members*

Surgeon-General W. Donovan, C.B.

Colonel B. M. Skinner, M.V.O. (convener).

Captain T. J. Wright.

The Sub-Committee was appointed by Minute 12 of the meeting of the R.A.M.C. Fund Committee held on January 19, 1914, to inquire into the question of the Corps subscribing as a body to the Army Athletic Association.

They find that membership of the Association requires an annual subscription of 5s. from each officer joining individually, and that corps units joining do so on payment of an annual subscription of 15s. per 100 strength.

The strength of the Corps serving at home may be taken as 510 officers and 3,065 W.O.s, N.C.O.s and men—3,575. This strength would require a subscription annually of £26 16s. 3d.

At present some of the R.A.M.C. companies subscribe and others do not, consequently an officer or man transferred from a subscribing to a non-subscribing company would lose the advantage of membership of the Association.

The most equitable method of meeting this difficulty and of ensuring that every athlete in the Corps shall be able to avail himself of army athletic meetings at all times will be that the Corps shall subscribe annually as a unit.

The Sub-Committee recognizes that there is no fund available as yet from which such subscriptions may be drawn, and recommends, therefore, that the matter be referred to the R.A.M.C. Central Mess and Games Committee with the suggestion that that Committee co-opt for this purpose representatives from each of the companies serving at home, with a view to considering whether it is possible to elaborate a scheme for providing ways and means by which the Corps as a whole may join the Army Athletic Association.



# ROYAL ARMY MEDICAL CORPS DINNER FUND.

BALANCE SHEET AND STATEMENT OF ACCOUNTS FOR THE YEAR ENDING DECEMBER 31, 1913.

RECEIPTS.		EXPENDITURE.	
1913	£ s. d.	1913	£ s. d.
Jan. 1. By Balance (Holt and Co.) .. ..	3 7 4	June 21. To Trocadero for Corps Dinner .. ..	327 0 0
June 16. " Cash taken at doors (Trocadero) .. ..	80 12 6	July 3. " Stationery and Printing (A. and N. Stores)	2 12 7
" 20. " Cheque from Secretary, R.A.M.C. Fund,		" " Band Expenses .. ..	2 7 5
in settlement of Trocadero's Account	246 7 6	" " Advertisements--	
July 5. " Cheque from Secretary, R.A.M.C. Fund..	15 0 0	Messrs. May and Williams .. ..	13 8 0
" 5. " Receipts by Bank (Holt and Co.) Sub-		<i>Morning Post</i> .. ..	1 1 0
scriptions .. ..	11 15 0	<i>Times</i> .. ..	0 10 6
		" " Conveyance of Plate--	
		R.A.M.C. Mess, London .. ..	0 10 0
		" " Woolwich .. ..	1 0 0
		" " Aldershot .. ..	1 17 0
		" " Postage .. ..	1 17 11
		" " Clerical Assistance .. ..	3 0 0
		Dec. 31. " Cash in Hand .. ..	0 2 1
		" 31. " Balance Credit, Holt and Co. ..	2 0 10
	£357 2 4		£357 2 4

Audited and found correct. (Signed) E. H. LYNDEN-BELL,  
Colonel.

Receipts in possession of Secretary, R.A.M.C. Fund.

# ROYAL ARMY MEDICAL CORPS OFFICERS' BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON MONDAY,  
APRIL 20, 1914, AT 3.15 P.M.

## *Present.*

Surgeon-General Sir Launelotte Gubbins, K.C.B., M.V.O., K.H.S., Director-General, President, in the Chair.

Surgeon-General W. Donovan, C.B.

Colonel E. T. Lynden-Bell.

Colonel W. Horrocks.

Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.

Lieutenant-Colonel E. M. Pilcher, D.S.O.

Major E. T. F. Birrell.

(1) The Minutes of the last Meeting were read and confirmed.

(2) The following Report for the year 1913 was adopted:—

"The number of subscribers for the year 1913 was 177, and the amount of subscriptions received came to £188 4s. 6d.

"The total receipts amounted to £909 5s. 6d., including £61 6s. from a rebate of Income Tax; the expenditure totalled £829 17s. 9d.

"Twenty-seven applicants, representing thirty-five orphans, received £725 in grants, varying from £10 to £40 according to the circumstances of the applicant.

"During the year a copy of the Rules was sent to every officer of the Corps.

"The new designation of the Society was adopted by a Resolution at the last Annual General Meeting."

(3) The Committee considered the applications for grants and recommend the following for the consideration of the Annual General Meeting:—

Three orphans of the late Staff-Surgeon D. O. D.	..	..	..	..	..	£30
Orphan of Inspector-General R. D.	..	..	..	..	..	30
Orphan of Surgeon-Major C. Q.	..	..	..	..	..	30
Orphan of Inspector-General D. A.	..	..	..	..	..	30
Two orphans of Lieutenant-Colonel H. W. A. M.	..	..	..	..	..	30
Orphan of Captain W. J. C.	..	..	..	..	..	20
Orphan of Surgeon-General A. S.	..	..	..	..	..	20
Orphan of Lieutenant-Colonel H. T. C.	..	..	..	..	..	25
Orphan of Surgeon-General J. O.	..	..	..	..	..	40
Orphan of Deputy Inspector-General F. T. I.	..	..	..	..	..	40
Two orphans of Surgeon-Major W. P. F.	..	..	..	..	..	40
McGrigor pension for boy	..	..	..	..	..	10
Orphan of Surgeon-General T. B.	..	..	..	..	..	30
Orphan of Surgeon-Major B. C. S.	..	..	..	..	..	25
Orphan of Captain H. H. S.	..	..	..	..	..	20
Orphan of Brigade-Surgeon J. W. H.	..	..	..	..	..	25
Orphan of Major P. G. I.	..	..	..	..	..	30
Three orphans of Captain G. C.	..	..	..	..	..	40
Orphan of Surgeon-General R. A. C.	..	..	..	..	..	25
Orphan of Surgeon-General J. W. M.	..	..	..	..	..	20
Orphan of J. W. C.	..	..	..	..	..	20
Orphan of Surgeon-General J. F.	..	..	..	..	..	25
Orphan of Brigade-Surgeon H. M.	..	..	..	..	..	20
Orphan of Surgeon-General W. L. H.	..	..	..	..	..	20
Two orphans of Lieutenant-Colonel H. J. P.	..	..	..	..	..	20
Two orphans of Captain and Quartermaster J. B. C.	..	..	..	..	..	30
Eight orphans of Lieutenant-Colonel J. W.	..	..	..	..	..	40

£735

F. W. H. DAVIE-HARRIS, *Lieutenant-Colonel,*

124, Victoria Street, S.W.

*Secretary.*

## ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

THE Ninety-ninth Annual General Meeting of this Society will be held at the Royal Army Medical College, on Tuesday, May 19, 1914, at 2.15.

Proceedings of a quarterly meeting of the Committee held at the War Office on Monday, April 20, 1914. Present:—

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., Director-General, President of the Society, in the Chair.

Deputy-Surgeon-General W. G. Don, Vice-President.

Surgeon-General Sir Charles Cuffe, K.C.B.

Surgeon-General Sir Arthur Sloggett, C.B., C.M.G., K.H.S.

Colonel W. H. Horrocks.

Colonel Sir William Leishman, F.R.S., K.H.P.

Lieutenant-Colonel A. F. S. Clarke.

Lieutenant-Colonel T. W. Gibbard.

Lieutenant-Colonel S. Guise Moores.

Letters were read from Surgeon-General W. S. M. Price and Colonel R. W. Ford, D.S.O., regretting their inability to attend.

The minutes of the previous meeting were confirmed.

The Balance Sheet, Accounts, and Reports for the year 1913, on the motion of the Chairman, were unanimously adopted. (These will be found below.)

It was resolved that the Annual General Meeting be held at the Royal Army Medical College, on Tuesday, May 19, at 2.15 p.m.

Payment of annuities according to the lists which were submitted was sanctioned. The withdrawal of the sum of £450 from deposit with the Commissioners for the Reduction of the National Debt was authorized, to pay annuitants on the old account.

The following were admitted as married members of the Society: Lieutenant-Colonel L. Way, Lieutenant-Colonel C. W. Allport (R.P.), Major G. M. Goldsmith, Captain G. H. J. Brown, Captain C. H. O'Rorke (provisionally).

The death was reported on March 4 of Colonel W. A. Parker, and his widow was placed on the list of annuitants. The deaths of two annuitants, Mrs. M. A. Holloway and Mrs. S. M. Cakett, were reported.

The Secretary brought forward the question of altering the Rules to permit of members whose subscriptions exceed £10 annually paying them by half-yearly instalments, if they so wished. A report from the Society's Actuary was admitted. As the opinion of the Committee was equally divided on the matter the subject dropped.

The payment of the audit fee (£10 10s.) to Messrs. Deloitte and Co. was sanctioned.

Payment of the Secretary's salary and office allowance for the past quarter was sanctioned, as was the refund to him of petty cash expended.

A vote of thanks to the President for his services in the Chair during the past five years was moved by the Vice-President, Deputy-Surgeon-General W. G. Don, and carried unanimously.

### REPORT OF THE COMMITTEE TO THE MEMBERS OF THE ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND FOR THE YEAR ENDED DECEMBER 31, 1913.

THE Committee have the honour to present the following report on the affairs of the Society and to submit the accounts for the year ended December 31, 1913.

At the Annual General Meeting, held in May, 1913, Lieutenant-Colonel S. Guise Moores was elected a member of the Committee in the place of Colonel D. Wardrop, C.V.O., who had removed from the vicinity of London. The following members of the Committee who retired by rotation were re-elected: Surgeon-General Sir Charles Cuffe, K.C.B., Colonel Sir William Leishman, F.R.S., K.H.P., and Major C. E. Pollock.

The Committee are glad to report that no married or unmarried members of the Society have died during the year. Nine new members have been admitted, and five annuitants have died. Details will be found in the following table, and in the nominal list of members.

Movement of members	Unmarried members		Married members		Annuitant members		Total	
Members on the books December 31, 1912 ..	14		146		76		236	
New members and new annuitants .. ..	+	-	+	-	+	-	+	-
Unmarried members who are now married .. ..	1	..	8	..	..	..	9	..
Members who have died .. ..	..	..	1	..	..	..	..	..
Members who have resigned .. ..	..	1	..	2	..	5	..	5
Married members who are now widowers .. ..	..	..	..	1	..	..	..	..
Members on the books, December 31, 1912	14		152		71		237	

There has been no change in the investments of the Society during the past year. The Committee regret the continued depreciation in the value of securities, which has fallen to the extent of £2,088 7s. during the year 1913. It must be remembered, however, that at the date of the valuation the recent depression of prices was at its lowest. During the rise which has since taken place the value of these securities has already increased by £1,810.

The amount of £101,497 11s. 7d., representing the deposit (old account) with the Commissioners for the reduction of the National Debt, is made up as under:—

	£	s.	d.
Balance at December 31, 1912 .. ..	98,768	6	10
Add interest at £3 16s. 0½d. per annum ..	3,779	4	9
	102,547	11	7
Deduct;—			
Amount withdrawn on account for payment of annuities .. ..	1,050	0	0
Balance as per Balance Sheet of December 31, 1913 .. ..	£101,497	11	7

Members are reminded that in the event of the death of a member abroad (which is verified at the War Office) the Committee will forward the sum due to the widow by telegraph, should she so request; any extra expense being borne by her.

It is hoped that members will do their best to bring the advantages of the Society to the notice of their brother officers.

War Office,  
April 20. 1914.

W. L. GUBBINS, *Director General,*  
*President, Chairman of the Meeting*  
*of this date.*

## ROYAL ARMY MEDICAL CORPS CENTRAL MESS AND GAMES COMMITTEE.

### NOTICE.

THE Committee, considering it highly desirable that, ultimately, all officers of the Corps should become subscribers to the Central Mess Fund, will make recommendations on the lines stated below (with possible additions to be published later) to the Annual General Meeting, which will be held in June next on the day of the Corps Dinner. Any officer desirous of submitting propositions connected with this Fund should send a statement of them to the Honorary Secretary before May 1, 1914. Such proposals should be accompanied by the names of proposer and seconder. If there is no valid objection to their discussion at the meeting they will be published in the June number of the CORPS JOURNAL.

The following are the recommendations referred to above:—

# ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

ACCOUNTS FOR THE YEAR 1913.

(In the form prescribed for the Annual Return of a Registered Friendly Society.)

## (A) BENEFIT FUND.

Dr.	INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Contributions for Benefits—								
Subscriptions for Widows' and Orphans' Fund..		2,049	2	8	Widows' Annuities .. .. .			
Interest on Investments of Benefit Funds .. ..		5,165	8	3	Interest on £5,655 17s. 4d. (balance of Management Fund at the end of the year 1912) at 3 per cent., transferred to Management Fund .. .. .			3,829 2 11
Total Income .. .. .		£7,214	10	11				169 13 6
Amount of Benefit Fund at the beginning of the year as per last Balance Sheet .. .. .		133,600	9	1	Total Expenditure .. .. .			£3,998 16 5
					Amount of Benefit Fund at the end of the year as per Balance Sheet (C) .. .. .			136,816 3 7
								£140,815 0 0

## (B) MANAGEMENT FUND.

Dr.	INCOME.	£	s.	d.	EXPENDITURE.	£	s.	d.
Interest for one year on £5,655 17s. 4d. at 3 per cent., transferred from Benefit Fund .. .. .		169	13	6	Secretary's Salary .. .. .			150 0 0
Management Fund at the beginning of the year as per last Balance Sheet .. .. .		5,655	17	4	Actuary's Fees .. .. .			60 0 0
					Auditors' Fees .. .. .			10 10 0
					Printing, Postages, and Stationery .. .. .			10 10 0
								12 3 7
					Total Expenditure .. .. .			£243 3 7
					Amount of Management Fund at the end of the year as per Balance Sheet (C) .. .. .			5,582 7 3
								£5,825 10 10

Dr.	LIABILITIES.		ASSETS.		CR.	
	£	s. d.	£	s. d.	£	s. d.
Total Benefit Fund, as per Account (A) .. ..	136,816	3 7				
Amount of Management Fund, as per Account (B) .. ..	5,852	7 3				
Other Liabilities—						
Inland Revenue Commissioners, for Income Tax deducted from Annuities .. ..	63	8 2				
Secretary's Salary and Office Allowance (from October 1 to December 31, 1913) .. ..	52	10 0				
Actuary's Fee .. ..	10	10 0				
Annuitant, for Half Year's Annuity (since drawn) .. ..	56	19 8				
To the Members of the Army Medical Officers' Widows' and Orphans' Fund.						
We have examined the above Balance Sheet with the Books and Vouchers of the Society and certify that it is in accordance therewith. The Securities and Cash Balances have been verified by us.						
DELOITTE, PLENDER, } Auditors, GRIFFITHS & CO., } 5, London Wall Buildings, Finsbury Circus, E.C. April 5, 1914.						
INVESTMENTS.						
(1) With the Commissioners for the Reduction of the National Debt—						
Old Account, at 2½ per cent per diem .. ..	£4,917	18 10	3 16	0½	101,497	11 7
(2) In the Public Funds—						
Two and a Half per Cent Consols .. ..			3 3	9	3,897	9 3
Dominion of Canada Three and a Half per Cent Stock, 1930-1950 .. ..	5,500	0 0	3 9	5	5,547	19 0
Newfoundland Three and a Half per Cent Stock, 1910 .. ..	2,000	0 0	3 11	9	1,948	19 0
(3) Upon the Security of Borough and County Rates, or other Corporate Funds—						
London County Council Three and a Half per Cent Stock .. ..	5,000	0 0	3 9	8	5,025	8 0
Metropolitan Water Board "B" Three per Cent Stock .. ..	5,000	0 0	3 11	10	4,175	6 0
(4) Other Securities—						
Great Western Railway Four per Cent Debenture Stock .. ..	5,000	0 0	3 12	4	5,530	8 0
London and North-Western Railway Three per Cent Debenture Stock .. ..	5,000	0 0	3 10	7	4,250	0 0
Caledonian Railway Four per Cent Debenture Stock .. ..	1,449	0 0	3 14	9	1,550	8 7
Midland Railway Two and a Half per Cent Debenture Stock .. ..	7,827	5 7	3 12	6	5,400	16 5
East Indian Railway Three and a Half per Cent Debenture Stock .. ..	2,060	0 0	3 14	6	1,936	8 0
NOTE—A valuation of the above Securities at middle published prices on Dec. 31, 1913, shows a depreciation of £1,711 14s. Interest accrued on Investments .. .. 325 0 0						
Income Tax recoverable .. .. 207 4 10						
Cash at Bankers .. .. 1,289 0 0						
£142,581 18 8						

(1) That all officers joining the Corps after March 1, 1914, who wish to become subscribers to the Central Mess Fund shall pay an entrance fee of £5 5s. and thereafter an annual subscription equivalent to one half of one day's pay of their rank and service, at British rates, on March 1, at which date their subscription shall be due in advance. (The above proposal is based on the fact that at present a young officer on joining pays £2 to the London mess, £2 16s. at Aldershot, and afterwards joining contributions to other messes at home and abroad. In days gone by, when the officer on probation drew 8s. a day, instead of 14s., he paid £5 5s. at Netley, and other contributions elsewhere.)

(2) That all other officers on the active, half-pay, and retired lists shall become members on payment of the annual subscription only. (It will be remembered that at the last Annual Meeting a resolution was adopted "that officers on the retired and half-pay lists be eligible as subscribers to the Fund, and that their annual subscription be at the rate of one half of one day's retired or half-pay of their rank. That messes be invited to accord the privilege of honorary membership to such subscribers.")

(3) Quartermasters will be considered honorary members of the Central Mess Fund without the payment of an annual subscription.

(4) That officers subscribing as above and the honorary members there mentioned shall be relieved of all joining contributions to messes (including those paid on promotion), the payment of such to be a charge on the Central Fund.

(5) That, as a tentative measure, such payment be made every quarter from the Central Fund, on requisition by the honorary secretaries of the various messes.

(6) That no increase in the existing rate of joining contributions be made without reference to the Central Mess Committee; and that the case of those messes which impose no joining contribution be specially considered.

(7) That the above payments from the Central Fund take place, retrospectively, as from March 1, 1914. Such joining contributions as may have been paid to messes between that date and the receipt of these resolutions be refunded direct to the members by the Honorary Secretary, Central Mess Committee, on production of a voucher.

The Committee proposes to take up, at its discretion, debentures of the Rawal Pindi Mess, as funds are available. By so doing not only will individual members of that mess benefit, but also the Central Mess Fund, as it will become part owner of the mess building.

## NOTES ON GAMES AND SPORT.

THE question of a corps subscription to the Army Athletic Association having been referred to the Games Committee it was considered by a sub-committee of that body, as it was understood that a report was desired without delay. This report will be found below, together with the letter from the Hon. Secretary Army Athletic Association; the report of a Sub-committee of the R.A.M.C. Fund Committee, by whom it was referred to the Games Committee, is given on page 124.

3, Homefield Road,  
Wimbledon Common, S.W.

J. T. CLAPHAM, Captain,  
Hon. Secretary.

### "ARMY ATHLETIC ASSOCIATION.

"SIR,—As a result of the meeting of representatives from units held here on July 25, 1913, two only of whom were against the proposal, the Army Council has sanctioned the formation of an Army Athletic Association, whose objects are to be:—

"(a) To encourage cross-country running and athletics generally throughout the army.

"(b) To enable commanding officers to give effect to the principles laid down in the training manuals of all branches of the army, wherein it expressly states "manly games are of value provided all the men and not a few selected teams take their part."

"(c) To supervise and control cross-country running in the army by indicating the lines on which cross-country running should be carried out, to protect our young soldiers from the injurious effects that may result from running long distances when untrained.

"(d) To promote clean running and true sportsmanship, to discourage foul running and unfair tactics, and to deal with any case of this nature brought to notice.

"(e) By improving the existing athletic grounds and by constructing others in stations where they do not at present exist, to give the opportunity to commanding



officers to carry out the principles laid down in our training manuals and thereby to raise the mental and physical well-being of their men.

"It is estimated that a subscription from units at the rate of 15s. per 100 men on their strength on March 31 of each year should give a sufficient income to enable the Association to meet the expenses of both command and army athletic meetings—formerly supported by donations from units—and eventually to carry out the objects of its formation.

"I should be obliged if you would be good enough to inform me, not later than January 1, 1914, if the units under your command will join the Association and so become eligible to take part in the above-mentioned athletic meetings, etc.

"Regimental, battalion, battery, etc., subscription include their depots.

"Yours truly,  
" (Signed) **WALTER WRIGHT, Captain,**  
" *Assist. Hon. Secretary A.A.A.*"

*The Headquarters Gymnasium,  
Aldershot,  
November 11, 1913.*

#### REPORT OF A SUB-COMMITTEE OF THE R.A.M.C. CENTRAL MESS AND GAMES COMMITTEE ON THE QUESTION OF A CORPS SUBSCRIPTION TO THE ARMY ATHLETIC ASSOCIATION WHICH WAS REFERRED TO IT BY A SUB-COMMITTEE OF THE R.A.M.C. FUND COMMITTEE.

##### *Present.*

Lieutenant-Colonel S. Guise Moores (Chairman).

Lieutenant-Colonel J. Jameson.

Major A. B. Smallman.

Captain G. A. D. Harvey.

(1) The Sub-committee would point out that the Central Mess Fund is not available for other than mess purposes. The committee of this fund, when instituted in June, 1912, was also instructed to watch over the interests of the corps in games and sport, with special reference to inter-regimental competitions, but was not authorized to spend any money on such objects.

(2) The Sub-committee recognizes fully the desirability of fostering athletics in general and of subscribing, as a corps, to the Army Athletic Association in particular. Inquiry has been made of the twenty-six companies stationed at home as to their willingness to subscribe to this Association. Nineteen are willing to do so; in the majority of cases up to the sum of one guinea.

(3) As officers do not usually subscribe to the R.A.M.C. regimental institutes from which the contributions mentioned in para. 2 would come, it is felt that many of them might wish to contribute to the above object in some other way.

(4) Such a contribution might be made:—

(a) By the diversion of a small amount, say £25 annually, from the corps fund.

(b) By voluntary subscriptions, not to exceed 5s. annually, from individual officers.

(5) The Sub-committee is of opinion, therefore, that the institution of a separate fund for the furtherance of games and athletics is essential. This fund to be called the Games Fund, and to be subscribed to by both officers and men.

(6) It is further of opinion that the most satisfactory method of starting such a games fund (from which the Army Athletic Association subscription would be paid) is by a combination of the suggestions detailed above in paras. 2 and 4 (a).

---

## UNITED SERVICES MEDICAL SOCIETY.

The next meeting of the above Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Thursday, May 14, at 5 p.m. Business: "The Transport of Wounded in War," Major A. J. Hull, F.R.C.S., R.A.M.C.

E. C. STANFORD, *Staff-Surgeon, R.N.*

G. A. D. HARVEY, *Captain, R.A.M.C.*

*Joint Hon. Secretaries.*

## CANADIAN ARMY MEDICAL CORPS.

WE have received the following notes from the D.G.M.S. :—

### EFFICIENCY AWARDS, ARMY MEDICAL CORPS.

The Association of Officers of the Medical Services has donated the sum of \$225 for efficiency awards for the Army Medical Service. Colonel G. S. Ryerson, Medical Reserve, Toronto, has donated a Challenge Cup for the most efficient Field Ambulance.

Major E. R. Brown, 5th Royal Highlanders, Montreal, has also given a Challenge Cup for the most efficient Stretcher-bearer Section.

The conditions of the award will be as follows :—

#### *Field Ambulances.*

1st Prize	...	...	...	...	The Ryerson Cup and	\$60
2nd Prize	..	...	...	...	...	\$30
3rd Prize	...	...	..	...	...	\$15

#### *Conditions.*

	Marks.
Clothing and Accoutrements	100
A. M. C. Drill, including First Aid	400
Company Books	200
Camp Sanitation	300
Manœuvre and Field Exercises	800
Signalling	50
Condition and quality of Horses	450
Condition of Harness	200
Condition and knowledge of Wagons	100
Driving and Riding	400

Total .. .. 3,000

One hundred marks will be deducted for absence of Commanding Officer, thirty for each officer, ten for each N.C.O. and man, and fifty for each horse.

#### *Cavalry Field Ambulance.*

1st Prize	...	...	...	...	...	...	...	...	\$50
2nd Prize	...	...	...	...	...	...	...	...	\$15
The conditions are the same as for Field Ambulance, except :—									Marks.
Condition and quality of Horses	...	...	...	...	...	...	...	...	650
Condition of Harness	...	...	...	...	...	...	...	...	400
Condition and knowledge of Wagons	...	...	...	...	...	...	...	...	300
Driving and Riding	...	...	...	...	...	...	...	...	800

Total .. .. 4,000

#### *Clearing Hospitals.*

Prize of \$25.

#### *Conditions.*

	Marks.
Clothing and Accoutrements	10
A. M. C. Drill and First Aid	20
Company Books	20
Camp Sanitation	40
Condition of Horses	10
Condition of Wagons	10
Condition of Harness	10
Ward Administration	100
Hospital Cooking	70
Hospital Improvisation	60

Total .. .. 350

Ten marks will be deducted for the absence of the Commanding Officer, four for each officer, two for each N.C.O. and man, and three for each horse.

<i>Stretcher-bearer Sections.</i>									
1st Prize	...	...	...	...	...	The Brown Cup and	\$15		
2nd Prize	...	...	...	...	...	...	10		
3rd Prize	...	...	...	...	...	...	5		
<i>Conditions.</i>									
Clothing and Accoutrements	...	...	...	...	...	...	1,000	Points.	
Drill, Infantry, and Stretcher	...	...	...	...	...	...	4,000		
First Aid	...	...	...	...	...	...	5,000		
Improvisation	...	...	...	...	...	...	5,000		
Total							15,000		

One thousand points will be deducted if no medical officer is present, and five hundred for each man absent.

These competitions will be judged at Annual Inspection. Medical officers making these inspections and so judging will submit results direct to the Director-General, Medical Services.

## OBITUARY.

### BRIGADE-SURGEON JOHN JOSEPH O'REILLY.

BRIGADE-SURGEON J. J. O'REILLY, died at Willesden, on March 28, 1914, aged 70. He received his medical education in Ireland and took the diplomas L.R.C.P.I. and L.M., and L.R.C.S.I. in 1865. He joined the Army as an Assistant-Surgeon, staff, in October, 1865, and was appointed an Assistant-Surgeon of the 71st Foot in 1866. He was promoted to be Surgeon in the Army Medical Department in 1873, Surgeon-Major in 1877, Surgeon Lieutenant-Colonel in 1885, and retired in 1886 with the honorary rank of Brigade-Surgeon. He served abroad in Gibraltar, Malta, and India. In 1878-80, he was on active service in the Afghan War and received the medal.

### BRIGADE-SURGEON EDWARD HOPKINS.

BRIGADE-SURGEON F. HOPKINS died at Carregeermen, Llandilofawr, Carmarthen-shire, on March 30, 1914, aged 77. He was born at Llwynzimm in the Parish of Llangadock, Carmarthen, on April 25, 1836. After taking the diploma of L.S.A.Lond. in 1857, and that of M.R.C.S.Eng. in 1858, he entered the service as an Assistant-Surgeon, staff, on April 22, 1858. He was appointed Assistant-Surgeon to the 71st Foot in 1860 and joined the 2nd Foot, with the same rank, in 1868. He was promoted Surgeon in the Army Medical Department in March, 1873, Surgeon-Major a month later, and retired with the honorary rank of Brigade-Surgeon in 1898. He served in the Indian Mutiny in 1858, being present at the action of Doadpore and the taking of Fort Mudedeia, receiving the medal. In 1863 he took part in the campaign on the North-west Frontier of India, and received the medal with clasp. In 1878-80 he was again on active service in the Afghan War, and took part in Lord Roberts's march from Kabul to Kandahar, and in the battle of Kandahar on September 1, obtaining the medal with clasp and bronze star. His final war service was in the Sudan expedition in 1884-5, when he received the medal with a clasp and the bronze star.

## BIRTHS.

WILSON.—At Fort Pitt, Chatham, on March 8, the wife of Captain H. T. Wilson, R.A.M.C., of a daughter.

GIBSON.—At Kamptee, India, on March 23, the wife of Captain H. Gibson, R.A.M.C., of a son (stillborn).

O'CALLAGHAN.—On April 1, at Dorset House, Dorset Square, S.W., the wife of Lieutenant-Colonel D. M. O'Callaghan, R.A.M.C., of a son.

JOHNSON.—On April 7, at 50, Stanwick Mansions, West Kensington, W., the wife of Captain V. G. Johnson, R.A.M.C., of a daughter.

CUMMINS.—On April 24, at Cullompton, Ashted, Surrey, the wife of Major S. Lyle Cummins, R.A.M.C., of a daughter.

## DEATHS.

O'REILLY.—At Willesden, on March 28, Honorary Brigade-Surgeon John Joseph O'Reilly, retired, Army Medical Staff, aged 70.

HOPKINS.—At Llandilofawr, Carmarthenshire, on March 30, Honorary Brigade Surgeon Edward Hopkins, retired, Army Medical Staff, aged 77.

## EXCHANGES, &amp;c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

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50	4	0 4 0	0 1 8	} 5 0	} 1 9	} 4 0	} 1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	} 6 6	} 3 3	} 5 6	} 2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	} 9 0	} 6 3	} 7 6	} 4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

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The back outside cover is not available for advertisements.

## Notices.

### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Captain J. A. Bennett, Captain C. J. Coppinger, Captain F. Gracie, Major D. Harvey, Major J. V. Forrest, Colonel R. J. S. Simpson, Surgeon-General Sir A. F. Bradshaw, Colonel R. H. Firth, Lieut.-Colonel J. B. Wilson.

The following publications have been received:—

*British*: Transactions of the Society of Tropical Medicine and Hygiene, The Australasian Medical Gazette, Army and Navy Gazette, The Lancet, The Indian Medical Gazette, The Medical Journal of South Africa, Tropical Veterinary Bulletin, Guy's Hospital Gazette, St. Thomas's Hospital Gazette, The Hospital, The South African Institute for Medical Research, St. Bartholomew's Hospital Journal, Proceedings of the Royal Society of Medicine, Tropical Diseases Bulletin, Red Cross and Ambulance News, The Indian Medical Journal, The Medical Review, The Practitioner, The Royal Engineers' Journal, Medical Press and Circular, The Journal of State Medicine, The British Journal of Tuberculosis, The Shield, The Journal of Tropical Medicine and Hygiene, The Cavalry Journal, Public Health, Journal of the Royal United Service Institution, Annual Report of the Public Health of Gibraltar, Bulletin of Entomological Research, Annals of Tropical Medicine and Parasitology.

*Foreign*: Bulletin of the Johns Hopkins Hospital, Schmidts Jahrbücher, Russian Naval Medical Journal, Giornale di Medicina Militare, Bulletin de la Société de Pathologie Exotique, Revista de Sanidad Militar, Archiv für Schiffs- und Tropen-Hygiene, Deutsche Militärärztliche Zeitschrift, Le Caducée, The Military Surgeon, Archives de Médecine et de Pharmacie Navales, Bulletin de l'Institut Pasteur, Bulletin of the United States Department of Agriculture, The Journal of Infectious Diseases, Norsk Tidsskrift for Militærmedicin, Archives de Médecine et de Pharmacie Militaires, Office International d'Hygiène Publique, American Medicine, Tidsskrift i Militær Hælsøve, Report of the Department on Sanitation of the Isthmian Canal Commission.

## MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at the War Office. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at the War Office, no entry of such qualifications can be recorded in the Distribution List.

Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

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"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"  
WAR OFFICE, WHITEHALL, S.W.



# JOURNAL

OF THE

## ROYAL ARMY MEDICAL CORPS.

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### Corps News.

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JUNE, 1914.

#### COMMANDS AND STAFF.

Brevet-Colonel Samuel Hickson, M.B., Royal Army Medical Corps, Honorary Surgeon to the King, to be Inspector of Medical Services, *vice* Colonel M. W. O'Keeffe, M.D., dated April 28, 1914.

#### ARMY MEDICAL SERVICE.

Major Harold P. W. Barrow, Royal Army Medical Corps, to be a Deputy Assistant Director-General at the War Office, *vice* Lieutenant-Colonel B. H. Scott, dated May 1, 1914.

#### ROYAL ARMY MEDICAL CORPS.

Supernumerary Lieutenant-Colonel Bertal H. Scott, M.B., is restored to the Establishment, *vice* C. C. Reilly, dated May 1, 1914.

Major Edgar Thomas Inkson, V.C., Royal Army Medical Corps, to be a Deputy Assistant Director of Medical Services of a Territorial Division, dated April 25, 1914.

Supernumerary Lieutenant Ernest W. Wade, M.B., is restored to the Establishment, dated May 1, 1914.

Quartermaster and Honorary Captain Frederick William Hall is placed on retired pay, dated April 26, 1914.

Serjeant-Major William Edmund Lowe to be Quartermaster, with the honorary rank of Lieutenant, dated April 26, 1914.

**ARRIVALS HOME ON LEAVE.**—Lieutenant-Colonel E. M. Hassard; Majors H. L. W. Norrington, W. H. S. Nickerson, V.C., J. W. West, J. Tobin, C. R. L. Ronayne, A. O. Duffey, H. E. J. A. Howley; Captains H. S. Dickson, A. L. Stevenson, A. L. Foster, D. S. Buist, J. Startin, C. G. Sherlook, C. T. V. Benson, E. M. Parsons-Smith, A. P. O'Connor; Lieutenant F. S. Tamplin.

**TRANSFERS.**—To Aldershot: Captain J. A. B. Sim, from London. To the Scottish Command: Lieutenant S. D. Large, from Aldershot.

**ROSTER FOR SERVICE ABROAD.**—Major R. Rutherford, Captains A. A. Meaden and T. B. Moriarty have exchanged to higher positions on the Roster with Major J. S. Bostock, Captains J. M. H. Conway and C. Bramhall, respectively.

**POSTINGS.**—Quartermaster and Honorary Lieutenant W. E. Lowe has been posted to the Royal Victoria Hospital, Netley, for duty.

**RESULTS OF EXAMINATIONS.**—The following results of examinations are notified for general information :—

Passed for promotion to the rank of Lieutenant-Colonel :—

In Appendix xiv, K.R., Part 2, Major E. W. W. Cochrane.

Passed for promotion to the rank of Major :—

(b) Captains A. S. Arthur, H. H. Blake, J. W. Houston, D. P. Johnstone; (c) ii, Captains Geo. G. Hughes, J. W. P. Seccombe, G. S. Kempthorne, C. R. Sylvester-Bradley, G. G. Tabustan, H. C. Hildreth, E. C. Lambkin, L. V. Byatt, G. A. D. Harvey N. E. Dunkerton, H. G. Sherran.

Passed for promotion to the rank of Captain :—

(c) ii, Lieutenants L. Buckley, W. T. Graham, F. S. Tamplin, T. H. Balfour, L. T. Poole, R. B. Phillips, E. V. Whitby.

## WARRANT OFFICERS, NON-COMMISSIONED OFFICERS, AND MEN.

### PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified :—

#### *To be Serjeant-Majors.*

No.	Rank and Name		Date	Section	Remarks
11123	Qmr.-Serjt.	Polhill, H. J. . .	7.2.14	..	Vice L. Jones, to H.M. Commission.
11225	„	Bennett, A. ..	18.2.14	..	„ J. Woollard, to H.M. Commission.
11410	„	Conolly, W. P.	18.2.14	..	„ E. E. Ward, to H.M. Commission.
10445	„	Haynes, E. ..	26.4.14	..	„ W. E. Lowe, to H.M. Commission.

#### *To be Quartermaster-Serjeants.*

14290	Staff-Serjt.	Scott-Badcock, W. H.	1.2.14	..	Vice H. Jones, discharged.
12146	„ ..	Wilson, W. J.	6.2.14	..	„ H. Allwork, to pension.
11250	„ ..	Sage, J. ..	7.2.14	..	„ H. J. Polhill, promoted.
14851	„ ..	Willsher, C. B.	18.2.14	..	„ A. Bennett, promoted.
14926	„ ..	Hunt, W. H. G.	18.2.14	..	„ W. P. Conolly, promoted.

*To be Staff-Serjeants.*

No.	Rank and Name		Date	Section	Remarks
14465	Serjeant ..	Cottey, R. ..	21.1.14	..	Vice E. Thuillier, to pension.
10074	Staff-Serjt.	Wilkins, H. ..	1.2.14	..	From Officers Training Corps, vice W. H. Scott-Badcock, promoted.
15955	Serjeant ..	Miller, H. G. ..	6.2.14	..	Vice W. J. Wilson, promoted.
15670	„ ..	Goodread, F. W.	7.2.14	..	„ J. Sage, promoted.
18863	„ ..	Mulcahy, J. ..	16.2.14	..	„ E. J. Lovegrove, to pension.
12352	„ ..	Curtis, J. H. ..	18.2.14	..	„ C. B. Willsher, promoted.
14835	„ ..	Cameron, J. ..	18.2.14	..	„ W. H. G. Hunt, promoted.
16264	„ ..	Harper, W. ..	18.2.14	..	„ J. Cameron, supernumerary.
12280	„ ..	Endacott, A. ..	27.3.14	..	„ C. Elliott, to pension.

*To be Serjeants.*

7342	Private ..	Sweet, E. E. ..	4.10.13	General Duty	On appointment as Serjeant-Tailor, vice W. C. Walden, to pension.
15538	Lce.-Serjt.	Jesson, E. H. ..	18.1.14	Nursing ..	Vice J. H. R. Boulton, to pension.
16442	„ ..	Lawson, W. ..	21.1.14	Cooking ..	„ R. Cottey, promoted.
17696	„ ..	Collins, S. ..	24.1.14	Nursing ..	„ J. E. March, to Officers Training Corps.
15967	„ ..	Tringham, W. T.	6.2.14	Clerical ..	„ H. G. Miller, promoted.
11827	Serjeant ..	Quinlan, M. K.	7.2.14	Nursing ..	From Colonial Employment, vice F. W. Goodread, promoted.
17726	Lce.-Serjt.	Murphy, C. P. ..	11.2.14	Clerical ..	Vice J. Blatter, discharged.
17727	„ ..	Wrigley, A. ..	16.2.14	„ ..	„ J. Mulcahy, promoted.
18382	„ ..	Bevan, B. B. ..	18.2.14	Cooking ..	„ J. H. Curtis, promoted.
17794	„ ..	Beckett, W. A.	18.2.14	Q.A.I.M.N.S.	„ W. Harper, promoted.
11566	„ ..	Brown, M. T. ..	27.3.14	General Duty	„ A. Endacott, promoted.

*To be Corporals.*

No.	Rank and Name		Date	Section	Remarks
19597	Lce.-Corpl.	Brindle, L. ..	1.1.14	General Duty	} To complete establishment.
19604	„ ..	Pollock, R. ..	1.1.14	Clerical ..	
19611	„ ..	Morris, F. ..	18.1.14	„ ..	
					Vice T. Luscombe, appointed Lance-Serjeant.
19619	„ ..	Aley, H. ..	19.1.14	General Duty	„ S. G. Murdock, deceased.
19620	„ ..	Carter, W. J. ..	21.1.14	Clerical ..	„ G. V. Chatten, appointed Lance-Serjeant.
19791	„ ..	Hossack, F. G.	24.1.14	Cooking ..	„ W. C. H. Mayo, appointed Lance-Serjeant.
19621	„ ..	Kite, W. E. ..	2.2.14	Nursing ..	„ R. H. T. Haigh, appointed Lance-Serjeant.
19630	„ ..	Taylor, A. ..	6.2.14	Cooking ..	„ G. P. Steer, appointed Lance-Serjeant.
19631	„ ..	Smith, J. F. ..	11.2.14	General Duty	„ H. Mayes, appointed Lance-Serjeant.
19660	„ ..	Webb, A. J. ..	12.2.14	Nursing ..	„ W. A. Lilley, discharged.
997	„ ..	Corbett, T. F. ..	16.2.14	Clerical ..	„ P. Bettison, appointed Lance-Serjeant.
17125	„ ..	Brockbank, M.	18.2.14	„ ..	„ T. J. Moffatt, appointed Lance-Serjeant.
6089	„ ..	Vidler, E. C. ..	18.2.14	General Duty	„ H. Siddall, appointed Lance-Serjeant.
18251	„ ..	Ovenden, E. E.	1.3.14	Nursing ..	„ H. Sanders, discharged medically unfit.
18410	„ ..	Wyeth, F. ..	9.3.14	Cooking ..	„ E. J. Rogerson, to pension.
18425	„ ..	Atkinson, F. W.	13.3.14	Nursing ..	„ D. Davies, discharged.
18799	„ ..	Smith, V. ..	27.3.14	Cooking ..	„ C. Dewhurst, appointed Lance-Serjeant.

# APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified :—

## *To be Lance-Serjeants.*

No.	Rank and Name		Date	Section	Remarks
17628	Corporal ..	Luscombe, T...	18.1.14	Clerical ..	Vice E. H. Jesson, promoted.
19966	„ ..	Chatten, G. V.	21.1.14	General Duty	„ W. Lawson, promoted.
18185	„ ..	Mayo, W. C. H.	24.1.14	Nursing ..	„ S. Collins, promoted.
18988	„ ..	Haigh, R. H. T.	2.2.14	„ ..	„ W. Methereil, to pension.
103	„ ..	Steer, G. P. ..	6.2.14	„ ..	„ W.T. Tringham, promoted.
19732	„ ..	Mayes, H. ..	11.2.14	„ ..	„ C. P. Murphy, promoted.
19618	„ ..	Bettison, P. ..	16.2.14	Clerical ..	„ A. Wrigley, promoted.
45	„ ..	Moffatt, T. J...	18.2.14	Nursing ..	„ B. B. Bevan, promoted.
19070	„ ..	Siddall, H. ..	18.2.14	Q.A.I.M.N.S.	„ W. A. Beckett, promoted.
15183	„ ..	Dewhurst, C. ..	27.3.14	Nursing ..	„ M. T. Brown, promoted.

## *To be Lance-Corporals.*

284	Private ..	Gregory, A. O.	1.1.14	Nursing ..	Vice R. Pollock, promoted.
15696	„ ..	Page, W. A. ..	18.1.14	General Duty	„ F. Morris, promoted.
296	„ ..	Wilson, F. G...	19.1.14	Nursing ..	„ H. Ale, promoted.
305	„ ..	Hobbes, J. W.	21.1.14	„ ..	„ W. J. Carter, promoted.
306	„ ..	Quelch, F. G...	24.1.14	General Duty	„ F. G. Hossack, promoted.
19979	„ ..	Thain, G. E. ..	2.2.14	„ „	„ W. E. Kite, promoted.
365	„ ..	Warner, W. O.	6.2.14	1st Class Clerk	„ A. Taylor, promoted.
879	„ ..	Loveland, A. G.	11.2.14	Cooking ..	„ A. W. Wright, reverted.
470	„ ..	Claridge, H. A.	11.2.14	1st Class Clerk	„ J. F. Smith, promoted.
501	„ ..	Benson, O. ..	12.2.14	General Duty	„ A. J. Webb, promoted.
530	„ ..	Adams, A. ..	16.2.14	Nursing ..	„ T. F. Corbett, promoted.
570	„ ..	Crooke, G. B...	18.2.14	General Duty	„ M. Brockbank, promoted.
590	„ ..	Gilbert, F. C...	18.2.14	Nursing ..	„ E. C. Vidler, promoted.
585	„ ..	Webb, G. E. S.	1.3.14	„ ..	„ E. E. Ovenden, promoted.
12382	„ ..	Kay, J. H. ..	9.3.14	Superintending Cook	„ F. Wyeth, promoted.
1112*	„ ..	Sheehan, J. ..	13.3.14	Nursing ..	„ F. W. Atkinson, promoted.
1970*	„ ..	Brunt, W. J. G.	27.3.14	1st Class Clerk	„ V. Smith, promoted.

\* Special under para. 281, Standing Orders.

## AWARD OF ARMY FORM C 344.

The undermentioned have been awarded A.F. C 344 on the dates specified :—

No.	Rank and Name	Date	No.	Rank and Name	Date
18873	Corpl. Spiers, W. J. ..	10.5.09	5316	Pte. .. Wall, W. G. H.	13.1.14
5034	Pte. .. Taprill, F. ..	11.6.13	4494	" .. Morris, A. L. ..	15.1.14
5025	" .. Parsons, E. ..	28.6.13	5151	" .. Francis, G. E.	15.1.14
103	L.-Srjt. Steer, G. P. ..	30.9.13	5328	" .. Maydon, F. ..	22.1.14
5241	Pte. .. Hollier, F. C. ..	31.12.13	5281	" .. Jerred, A. ..	24.1.14
12779	Serjt. Stubbs, G. ..	1.1.14	17928	Serjt. Toye, W. S. ..	31.1.14
5250	Pte. .. King, H. T. ..	6.1.14	14761	" .. Robertson, W.	6.2.14
1951	" .. Money, F. J. R.	8.1.14	19916	L.-Cpl. Carroll, H. J. ..	6.2.14
4624	" .. Wharram, L.S.S.	8.1.14			

## NURSING SECTION.

The following appointments to the Nursing Section of the Corps will take effect from the dates specified :—

19223	Cpl. .. Stafford, J. H.	1.4.12	5010	Pte. .. Hague,	14.2.14
266*	" .. George, W. E.	1.3.13		W. E. H. J.	
6774	Pte. .. Quinlisk, T. ..	1.1.14	7008	" .. Salmon, E. ..	14.2.14
6827	" .. Griffith, G. R.	1.1.14	5345	" .. Pullen, A. E. ..	23.2.14
6840	" .. Steedman, W. ..	1.1.14	5532	" .. Lawrence, F. E.	23.2.14
6842	" .. Hancox, J. ..	1.1.14	5786	" .. Burgess, F. ..	23.2.14
6990	" .. Montague, H. ..	1.1.14	6331	" .. Fairfield,	27.2.14
7071	" .. Taylor, B. ..	1.1.14		W. E. H. C.	
6720	" .. Preston, E. T. G.	2.1.14	6789	" .. Rogers, H. ..	27.2.14
6953	" .. Sutton, W. ..	2.1.14	7186	" .. Brewer, W. ..	27.2.14
7097	" .. Walker, N. D.	2.1.14	7214	" .. Osborne, T. B.	27.2.14
7104	" .. Hack, E. ..	2.1.14	7215	" .. Wallis, A. T. ..	27.2.14
4727	" .. Conway, J. T. ..	6.1.14	7216	" .. Hesketh, T. ..	27.2.14
6715	" .. Dorland, J. ..	10.1.14	7080	" .. Barrett, H. S.	2.3.14
5228	" .. Skinner, E. W.	16.1.14	7143	" .. Pollen, A. C. ..	2.3.14
6127	" .. O'Rourke, A. ..	16.1.14	7202	" .. Carter, J. A. ..	2.3.14
6311	" .. O'Brien, J. ..	19.1.14	7290	" .. Chamberlain,	4.3.14
6790	" .. Squibb, H. G.	19.1.14		G. W.	
7127	" .. Stocks, C. ..	19.1.14	17450	Serjt. Elsey, W. J. ..	6.3.14
7133	" .. Sambrook, F. ..	19.1.14	6930	Pte. .. Cuthbertson, J.	9.3.14
7082	" .. Donkin, J. J. ..	21.1.14	7024	" .. Pearce, W. B.	10.3.14
6795	" .. French, C. ..	30.1.14	7264	" .. Simpson, F. H.	14.3.14
7061	" .. Wise, C. D. ..	30.1.14	6872	" .. Price, C. J. ..	18.3.14
7230	" .. Berry, E. ..	30.1.14	6966	" .. Lewin, W. ..	18.3.14
6931	" .. Algar, E. C. ..	31.1.14	7117	" .. Campbell, J. P.	18.3.14
6944	" .. Newland, F. ..	31.1.14	6740	" .. Phelan, W. ..	19.3.14
6949	" .. Balcombe, R. ..	31.1.14	6956	" .. Stapleton, J. ..	19.3.14
7149	" .. Paskell, F. A. ..	31.1.14	7170	" .. Riddle, E. C. ..	19.3.14
7160	" .. Gale, S. ..	31.1.14	7173	" .. McKenzie, P. ..	19.3.14
6916	" .. Kavanagh, R. ..	3.2.14	7213	" .. Downes, W. ..	19.3.14
7109	" .. Smith, J. R. ..	12.2.14	18332	L.-Srjt. Bevan, B. B. ..	28.3.14
6812	" .. Musgrave, R. C.	13.2.14	18259	Cpl. .. Roden, W. T. ..	28.3.14
6923	" .. Preedy, W. T.	13.2.14	4942	Pte. .. McCombie, A. ..	28.3.14

\* Supernumerary.

### ADVANCEMENT OF PRIVATES (CORPS PAY).

The following advancements in rate of Corps Pay will take effect from April 1, 1914 :—

*To be Advanced to the Third Rate (at 8d.).*

*As Orderlies.*

No.	Name	No.	Name	No.	Name
1216	Dunne, J.	5458	Vicary, R. L.	5578	Bannon, J.
4607	Anderson, J.	5463	Taylor, H. E.	5628	Garwood, A.
5108	Westwood, C.	5530	Brotherstone, W. M.	5717	Blair, T. W.
5358	Fenn, G. D.	5568	Voice, A. E.	5806	Stevens, E. S.

*As Clerks.*

5134	Vaughan, A.	6162	Morris, H.		
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*To be Advanced to the Fourth Rate (at 6d.).*

*As Orderlies.*

5857	Terry, W. G. T.	6326	Harris, F. W.	6492	Leggett, A. T.
5884	Jay, E. B.	6352	Whiting, F. C.	6629	Budden, H. E.
6093	Pennington, A. T.	6405	Brooker, H.		
6261	Edge, F.	6425	Wheeler, G.		

*As Cooks.*

1682	Emery, H. L.	5987	Tinker, W. P.	6719	Gillard, F. H.
2175	Hazzard, W. C.	6183	McDonald, A.	6769	Bane, H. B.
4312	Edwards, H.	6583	Webb, G.	6862	Willshire, R. H.
5669	Clark, H.	6591	Kempton, F. M.	7053	Blundell, A. F.
5855	Blowers, C.	6660	Heffer, W.		

### SANITARY ORDERLIES.

The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, from the dates specified :—

No.	Name	Date	No.	Name	Date
19650	Gawn, H. ..	13.11.13	7000	Patterson, L. ..	24.1.14
6164	Parfitt, B. N. ..	14.11.13	7103	Altree, A. ..	31.1.14
6984	Roach, H. ..	1.1.14	6683	Willis, C. W. ..	31.1.14
6945	Herbert, A. E. C. ..	6.1.14	5388	Wilkie, W. ..	2.2.14
6058	Knight, F. ..	7.1.14	246	Burns, H. ..	4.2.14
5914	Pashley, G. ..	7.1.14	5411	Griffiths, J. L. ..	16.2.14
1447	Conway, P. ..	8.1.14	6896	Bray, T. ..	19.2.14
5699	Ibbotson, S. C. ..	10.1.14	5851	Warner, J. ..	19.2.14
1501	Thompson, F. ..	11.1.14	6281	Howlett, H. W. ..	20.2.14
5962	Smith, W. R. ..	16.1.14	5818	Jones, W. ..	13.3.14
6251	Wright, T. P. ..	19.1.14	6613	Frater, C. H. ..	21.3.14
6888	Bromilow, T. ..	23.1.14	6026	Lynch, F. ..	26.3.14

### BUGLERS.

The following Boys are appointed Buglers from the dates specified :—

6849	Ford, H. J. ..	9.1.14	6943	Gilmour, A. W. J. ..	16.2.14
6762	Tomlin, T. ..	13.1.14	6997	Mayl, A. R. D. ..	28.3.14
6695	Osborne, R. ..	30.1.14			



## PROMOTION CANCELLED.

The promotion of No. 19454 Lance-Corporal E. S. Renshaw is cancelled.

## DISCHARGES.

9668	Qmr.-Serjt.	Hurrell, G...	..	25.4.14	After 3 months' notice.
17234	Staff-Serjt.	Jones, W. ..	..	29.4.14	Termination of engagement, Army Order 106/1900.
10034	..	Mulley, F. A.	..	2.5.14	Termination of second period.
10024	..	Lampard, G.	..	27.4.14	" " "
11450	..	Owens, A. H.	..	7.5.14	" " "
10029	Serjeant	Barrett, F. B.	..	2.5.14	" " "
17584	Corporal	Preston, W.	..	22.4.14	" first period.
12518	..	Gale, H. ..	..	15.4.14	Free after 14 years.
10036	..	Stanley, F...	..	7.5.14	Termination of second period.
10044	..	Hickman, C. W.	..	9.5.14	" " "
10561	Private	Byles, C. E.	..	14.4.14	Physically unfit.
9952	..	Baker, W. R.	..	16.4.14	After 3 months' notice.
7530	..	Taberner, G.	..	16.4.14	Payment of £10.
7748	..	Martin, A. ..	..	23.4.14	" " "
10941	..	Moody, T. ..	..	2.5.14	After 18 years.
6661	..	Mayhew, H. J.	..	11.5.14	Physically unfit.
7256	..	Cox, F. T. ..	..	12.5.14	" "

## TRANSFERS TO ARMY RESERVE.

5453	Pte.	Chaffe, W. E. ..	11.4.14	5474	Pte.	Sullivan, J. M...	30.4.14
5438	"	Rutherford, J. ..	11.4.14	5469	"	Jordan, G. H. ..	25.4.14
5443	"	Perrin, P. ..	12.4.14	5471	"	Thompson, F. ..	27.4.14
5439	"	Brogden, E. G.	12.4.14	5481	"	Watts, J. C. ..	30.4.14
5437	"	Forryan, G. ..	9.4.14	5475	"	Masters, R. ..	1.5.14
5442	L.-Cpl.	Woodward, A. E.	12.4.14	5482	"	Laird, A. G. ..	2.5.14
5454	Pte.	Hill, T. G. ..	19.4.14	17945	"	Price, A. ..	2.5.14
5456	"	George, H. ..	19.4.14	5478	"	Hughes, A. F. ..	3.5.14
5451	"	Willson, A. V...	19.4.14	5486	"	Osborne, C. H...	3.5.14
5448	"	Doyle, D. ..	16.4.14	18979	Cpl.	Bushnell, S. R.	4.5.14
5458	"	Vicary, R. L. ..	20.4.14	5483	Pte.	Ettridge, F. O...	7.5.14
5462	"	Dewhirst, N. P.	24.4.14	5480	"	Shute, C. H. ..	4.5.14
5566	"	Douce, T. ..	20.4.14	5479	"	Weyman, A. J.	4.5.14
5460	"	Gee, H. J. R. ..	23.4.14			McK.	
5467	"	Brown, H. A. W.	26.4.14	1247	"	Buckland, F. E.	7.5.14
5466	"	Neilson, R. ..	25.4.14	5487	"	Morris, C. O. ..	8.5.14
5473	"	Price, A. T. ..	30.4.14	5488	"	Mayers, A. ..	9.5.14
5465	"	Watson, J. ..	25.4.14	1131	"	Burge, F. V. ..	9.5.14
5468	"	Smith, A. R. ..	26.4.14	5485	"	Thomas, G. E...	9.5.14
4607	"	Anderson, J. ..	26.4.14	5490	"	Haydon, E. ..	9.5.14
1098	"	Wright, G. M...	26.4.14	5843	"	Fraser, J. ..	9.5.14
1102	"	Hako, J. G. ..	29.4.14	5491	"	Collyer, E. L. ..	10.5.14
5472	"	Cooper, R. J. ..	28.4.14	5496	"	Greet, G. W. ..	11.5.14
5459	"	Bennett, H. S...	21.4.14	5489	"	Wilkins, W. J...	9.5.14

## TRANSFER FROM OTHER CORPS.

7744	Private	..	Cronin, J. L. ..	19.3.14	From 2nd Bn. D.C.L. Infantry..
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## TRANSFERS TO OTHER CORPS.

11396	S.-Serjt. ..	Pell, A. E. ..	9.5.14	To 2nd High. Fd. Amb.
12533	Serjeant ..	Ward, H. C. ..	18.4.14	R.A.M.C.T. ,, 2nd E. Lanc. Fd. Amb.
12709	.. ..	Ford, H. J. ..	5.5.14	R.A.M.C.T. ,, Newcastle Sch. of Ins. T.F.
12411	.. ..	Sims, A. A. ..	29.4.14	,, Colonial Government.
12588	.. ..	Meason, J. ..	29.4.14	,, ..
14082	.. ..	Prince, G. ..	29.4.14	,, ..
17573	.. ..	Harlen, C. ..	29.4.14	,, ..
751	.. ..	Milne, A. J. ..	29.4.14	,, ..
7461	Private ..	Davies, F. W. ..	1.4.14	,, R.F.A.
7365	.. ..	Howell, J. ..	6.4.14	,, 20th Hussars.
7591	.. ..	Hardgrave, R. ..	7.4.14	,, 3rd Worcester Regiment.
1430	.. ..	Perkins, W. T. ..	9.4.14	,, Egyptian Army.

THE FOLLOWING N.C.Os. AND MEN HAVE PASSED THE NECESSARY  
CORPS EXAMINATIONS FOR PROMOTION.

## FOR QUARTERMASTER-SERJEANT.

10950 | S.-Serjt. .. | Virgo, H. V. || 10912 | S.-Serjt. .. | McMahon, J. H.

## FOR STAFF-SERJEANT.

18933 | Serjeant | Thompson, H. L. || 18976 | Serjeant | Robinson, E. G.  
12819 | „ | Riches, W. H.

## FOR SERJEANT.

14850 | Corporal .. | Mayman, T. J. || 17501 | Corporal .. | Christie, J.  
764 | „ | Boddy, R. || 19093 | „ | Lane, A.  
19468 | „ | Jack, G. D. || 19823 | „ | Kilyon, T. J.  
19086 | „ | Wain, A. || 4882 | „ | Summers, F. G.  
19347 | „ | White, A. J.

## FOR CORPORAL.

6594 | Private .. | Simons, A. || 5430 | Private .. | Dickson, S.  
5691 | „ .. | Gallagher, G. || 5773 | „ .. | Anthony, W.  
6386 | „ .. | Price, W. G. || 6671 | „ .. | Plumridge, J. H.  
4738 | „ .. | Dell, G. L. || 5507 | „ .. | Page, F. R.  
4936 | „ .. | Strange, H. E. || 5348 | „ .. | Evans, H. J.  
7189 | „ .. | Newell, E. F. || 4727 | „ .. | Conway, J. T.  
19709 | „ .. | Young, W. E. || 1673 | „ .. | Mitchell, A.  
1805 | „ .. | Geary, R. || 1939 | „ .. | Sawers, W.  
1962 | „ .. | Storton, G. || 1993 | „ .. | Passingham, E. G.  
1998 | „ .. | Patrick, E. || 4312 | „ .. | Edwards, H.  
4547 | „ .. | Lynn, G. A. || 7407 | „ .. | Rich, C.  
5911 | „ .. | Howard, H. J. || 6321 | „ .. | Stewart, A. E.

## NON-EUROPEAN SECTION R.A.M.C.

## FOR CORPORAL.

15 | Private .. | Adams, J. || 22 | Private .. | Thomas, S.

**NOTES FROM DEVONPORT.**—“It is so long since a few notes of the corps in the ‘western counties’ appeared in the Journal, that old Devonian comrades may be under the impression that we do not exist, except of course on the pay list, but, as will be seen by the following, we have been fairly busy in the social and sporting world.

“No. 7 Company, R.A.M.C. held their annual ball in the Stonehouse Town Hall, on March 6, and this annual event proved as great a success as ever. Fully 600 guests

attended, including Colonel R. J. Geddes, D.S.O., our A.D.M.S. ; Lieutenant-Colonel R. L. R. Macleod, our C.O. ; Major T. H. Goodwin, D.S.O., our company officer ; and all the officers and ladies of the corps serving in the three towns. All ranks and friends had a most enjoyable time, the ball concluding at 2 a.m. The success was mainly due to our very energetic committee, which consisted of Quartermaster-Serjeant H. Steele, Serjeant Burden, Corporal Ward, Lance-Corporal Dowers, Privates Jarvie, Brindley and Bridson, the M.Cs. being Serjeants Cole, Joyce, Lunn, and Corporal Salter.

"Owing to the great success of the annual ball, and with a view of returning the many kind invitations received from the various units in the garrison to their respective dances during the season, it was decided to have a N.C.Os. dance, which was held in the garrison gymnasium, Devonport, on March 18. Although this was the first of its kind that has been held for some years, it proved a great success in every way. The guests numbered about 500, and all had an enjoyable time. The Committee consisted of Serjeants Cole, Burden, and Prince ; Corporals Green, Howes, Ward, and Salter. The refreshment arrangements were ably carried out by Serjeants Wills and Joyce, and the duties of M.C. by Quartermaster-Serjeant Steele and Staff-Serjeant Gosling.

"Our old serjeant-major, Mr. E. E. Ward was promoted to commissioned rank on February 18, and was presented with a dress sword from the members of the serjeants' mess at a farewell concert given in his honour prior to his departure for Belfast. We all wish him, Mrs. Ward, and family, the best of good wishes, hoping that they will still have a few kind thoughts for old Devonport and No. 7 Company.

"Serjeant-Major H. B. Lee arrived for duty after the departure of Lieutenant Ward, and has come at a very busy period, the camping season.

"We have not been backward in the 'marriage market' either. We have lost two supposed confirmed bachelors in the persons of Quartermaster-Serjeant H. Steele (which may surprise old Aldershot friends), and Serjeant P. Wills. In the case of the former, the event was solemnized at St. Paul's Church, Stonehouse, the service being fully choral. The company officer, Major T. H. Goodwin, and Mrs. Goodwin attended, and Staff-Serjeant E. E. Steele, R.A.M.C., from London, performed the duties of best man, assisted by Colour-Serjeant Steele, of the Somerset Light Infantry, from Bordon. The serjeant-major, serjeants, etc., of the corps attended in force, and formed an 'arch of steel' for the happy couple as they left the church. A reception was held at the house of the bride's father, Mr. Laurence, in Stonehouse, and the happy couple left for their honeymoon on the North Devon coast with every good wish from the assembly, together with someone's ammunition boot tied on behind the taxi. Rumour has it that the boot belonged to Serjeant Prince, who takes a special measurement form.

"As regards Serjeant Wills, this happy event takes place on the 16th inst., and I believe the other boot is being held in readiness.

"Serjeant Blackman leaves us shortly on discharge to pension and proceeds to Entebbe, Uganda, having obtained an appointment under the Crown Agents for the Colonies. We all wish him the best of luck, and hope he will not forget a few lions' skins, etc., when he commences his hunting trips.

"We have also not disgraced ourselves on the sports field. During the past season we entered the 2nd Division of the Devon Wednesday league, and also the Devon Wednesday Cup, which is open to all comers. In the league we completed our fixtures with 22 matches, out of which we won 14, drew 1, lost 7, and finished fourth from the top. We had the best goal average, having scored 84 against 33 lost. In the games we lost, on one occasion only did we lose by more than the odd goal, which shows that our conquerors had no 'walk over.' We also took three points out of four from the team which won the league.

"In the Wednesday Cup we were beaten by the R.M.L.I. who were too strong for our small company ; their strength being about 1,000, whilst we were under 90. Still we put up a good fight and lost by three goals.

"All our players have done well and it would be unfair to give more credit to one than another. The games have been fought in a sporting spirit, and the esprit de corps prevalent has in no small measure contributed to our success.

"As regards the cricket season we have already won our first two games, beating Devonport Police and the Earl of Mount Edgcumbe's Estate, and hope for further successes.

"At the examination for A.F.C. 344 in 1913, we had four candidates from No. 7 Company, and they certainly held their own in comparison with other companies, all being in the first six, taking the following positions:—

Private A. Jerred	..	..	2 with 91 marks.
Private E. Stamford	..	..	4 " 89 "
Serjeant R. Cole	..	..	5 " 89 "
Private F. Pawson	..	..	6 " 89 "

"The credit was mainly due to the energy of our company officer, Major T. H. Goodwin, and Staff-Nurse M. E. Davis, Q.A.I.M.N.S., who coached the candidates. We have three candidates this year and are hoping for the top man to be of No. 7 Company.

"We also entered a team for the Military Hospital Cookery Challenge Shield which came out fourth on the list.

"The team were composed of Serjeant A. Joyce, awarded a silver medal and 5s., and Corporal G. Salter, awarded a bronze medal and 2s. 6d.

**NOTES FROM CAIRO.**—Lieutenant and Quartermaster C. W. Kinsella, writes : "On Easter Monday the junior N.C.Os. and men of the company held a most enjoyable outing to the Nile Barrage, some 18 miles by rail from Cairo.

"The venue was reached about 10 a.m., when light refreshments were served and the party then dispersed for donkey rides and other forms of amusement, while a section of the 2nd Devon's band, for whose services we have given a hearty vote of thanks, enlivened the glades with selections of rag-time and other popular melodies.

"Tables were pitched under the sheltering trees amidst delightful scenery, the acres of meadow and landscape gardens and lawns being seen at their best.



"Luncheon was served at 1 p.m., when an excellent menu of cold meats with hot potatoes and vegetables, followed by jellies and similar luxuries, washed down with suitable liquor, was done full justice to.

"After the usual loyal toasts had been honoured, the health of the officers was given by Quartermaster-Serjeant Conolly, and suitably responded to by Major Potter, company officer.

"Sports then passed away the afternoon, the chief event of which was a tug-of-war between a company team and the R.H.A., who were picnicking close by, and which resulted in a somewhat easy win for the 'horse gunners,' who secured the 'shield' especially made for the occasion. A second 'tug,' between N.C.Os. and Privates, resulted in a win for the latter, their reward being a cup of somewhat weird design, and not hall-marked.

"Various races completed the programme, at the conclusion of which Mrs. Potter kindly presented the prizes.

"Tea having been done justice to, the party returned to Cairo about 7 p.m., after a most enjoyable day.

"Amongst the guests present were Major Douglas, V.C., D.S.O., Major and Mrs. Potter, Lieutenant and Mrs. Kinsella, and several representatives of the corps in garrison.

"A meed of praise is due to Corporal Thompson and his excellent committee for the very thorough manner in which the whole of the arrangements were carried out."

**NOTES FROM SIMLA.**—Lieutenant-Colonel A. P. Blenkinsop, R.A.M.C., Assistant Director Medical Services (British Service), writes as follows, dated Simla, April 23, 1914: "*Appointments.*—Lieutenant-Colonel A. T. I. Lilly, R.A.M.C., having proceeded on leave, Lieutenant-Colonel H. E. Winter, R.A.M.C., has taken over the duties of Officiating Assistant Director of Medical Services, Bombay Brigade.

"The undermentioned officers have been selected for the command of the station hospitals shown against them: Lieutenant-Colonel C. H. Hale, D.S.O., Station Hospital, Sialkot. Lieutenant-Colonel H. E. Winter, Station Hospital, Colaba. Lieutenant-Colonel W. E. Hardy, Station Hospital, Calcutta.

"*Specialist.*—Major C. T. Samman has been appointed specialist in Mental Science, Southern Army.

"*Transfer.*—The transfer of Captain W. B. Rennie, R.A.M.C., to the 5th (Mhow) Division has been cancelled."

**NOTES FROM PESHAWAR.**—Captain J. W. Houston writes: "No notes from Peshawar having appeared in the Journal for some time, perhaps a few now may be of interest to those who have served in this verdant cantonment. We have been just a little in the public eye lately, on account of various raids and murders by some of our friends from over the border. These have resulted only in a small punitive expedition of two brigades against the Bunerwals, in which we sent a force over the Malandri pass and burnt some villages and carried off a few cattle. The casualties on our side were nil, but to the tribesmen it meant the loss of nine killed. The affair only lasted three days, and the hopes which were raised, of a big thing with medals and decorations as an aftermath, have been disappointed.

"Old timers will be glad to hear that the mess is going strong, though they would find many changes were they to come back. The whole front of the entrance hall has been removed and replaced by wood and glass in the form of a bow window door. The hall has been furnished and decorated, the whole making a great improvement. All this we owe to the initiative of our energetic S.M.O., Lieutenant-Colonel E. G. Browne, whose energies have also had an outlet in a complete remodelling of the Families Hospital, which, instead of being an eyesore, has now become an ornament to a mall famous throughout India for its beauty. The interior is as completely changed as the exterior, and Major J. H. Robinson, who is in charge, can congratulate himself on having not only wards, but an operating room of the most modern type in which to work. The new ward for officers' wives is a feature of the place and, from the general downwards, all officers here recognize how well Lieutenant-Colonel Browne has both initiated and carried through his scheme of improvement, in which he has been ably supported by the garrison engineer, Lieutenant-Colonel Campbell, of the R.E. and Military Works Service.

"In the world of sport, we continue to hold our own in whatever branches of it our numbers will allow of our competing. In Major A. W. Jameson and Captain R. F. Bridges we possess two of the best golfers here, and we know they only await a favourable opportunity in Gulmarg, before making the mess table groan under the weight of their trophies. Quite recently, our versatile A.D.M.S., Colonel R. H. Firth, partnered by Captain H. W. Carson, won the men's handicap doubles at the annual tennis tournament, defeating two well-known cracks in a hotly contested final of the best of five sets. On the day's form, our representatives would have been hard to beat anywhere, as Colonel Firth's steadiness and beautifully placed lobs, combined with Carson's fine work at the net, were a particularly effective combination.

"Various members of the mess have been disporting themselves during the past season with the well-known Peshawar Vale Hunt, and Captain H. H. Blake, on his redoubtable fencer 'Kim,' has shown the way over the trickiest of 'gridirons' to the entire field. We all think he would have won the hunt point-to-point race only for his horse straining a fetlock shortly before the race. In this branch of sport, we miss our former messmate, Major H. G. F. Stallard, who has gone to Mhow as D.A.D.M. (Mob.) His coat tails flying in the van were a familiar and exhilarating sight to all.

"Major R. L. Popham, from home, and Lieutenant W. L. Fretz, from Ambala, have

lately formed welcome additions to the mess, but we are soon to lose Captains Blake and Carson, who will be tour-expired early next trooping season.

"In the social sphere, our corps and mess have been well to the front, entertaining at the polo tournament and the cricket matches. At the club dances our representatives are in the first flight, so much so that we understand, in respect of more than one of our exponents of the new dances, their would-be partners draw lots as to who shall be the favoured one. To the home folk, distracted by a militant suffragist movement, this may read as a welcome reaction for the times.

"Losing as we do, next trooping season, two of our popular members, we are wondering whom we shall get as their reliefs. To men down for India in 1914-15, it may be pertinent to remark: if you are unmarried do not overlook the advantages of the 1st Division, where you have every chance of a frontier scrap, of a good ducking in the hunting field, a splendid game of golf, a batsman's wicket for cricket, ideal tennis courts, the run of an excellent mess, and for your work the use of a tip-top hospital, and the opportunity of serving under seniors who, while demanding a high standard of efficiency, manage to secure it without setting unnecessary tasks. We all feel that we might go farther and fare worse."

STATION HOSPITAL, QUETTA, HOCKEY TEAM, 1914.



- |                                |    |   |   |                               |    |   |    |
|--------------------------------|----|---|---|-------------------------------|----|---|----|
| 5                              |    | 1 | 2 | 3                             | 4  |   | 10 |
|                                | 6  | 7 |   | 8                             |    | 9 |    |
|                                | 11 |   |   |                               | 12 |   |    |
| 1. Capt. R. C. Paris.          |    |   |   | 7. Capt. N. Dunbar Walker.    |    |   |    |
| 2. Asst.-Surg. Lincoln.        |    |   |   | 8. Major L. Addams Williams.  |    |   |    |
| 3. Asst.-Surg. Cartner.        |    |   |   | 9. Asst.-Surg. Brodie.        |    |   |    |
| 4. Asst.-Surg. Vardon.         |    |   |   | 10. Asst.-Surg. Easdon.       |    |   |    |
| 5. Lieut. W. McNaughtan.       |    |   |   | 11. Nursing Orderly Williams. |    |   |    |
| 6. Lieut. A. G. J. MacIlwaine. |    |   |   | 12. Asst.-Surg. Mason.        |    |   |    |

No. 4. A regular player but hurt before the Tournament.

**NOTES FROM QUETTA.**—Captain N. Dunbar Walker writes: "The winning by the Station Hospital, Quetta, of the Cup presented by the Murree Brewery Company for the 4th (Quetta) Divisional hockey tournament is an event which must be recorded in the Journal. Last year we started a hockey club in the Station

Hospital and entered a team in the tournament, but we did not survive the first round. This season we have had several additions to our staff of hockey players and have really been able to put a good team in the field with the result already mentioned. Perhaps brother officers may not know or realize what talent there is amongst our warrant officers, or we should hear of other station hospital teams. The majority of assistant surgeons play at college, and here in Quetta the Hockey Committee allow us to play any British nursing orderly who is actually living in the hospital and not required by his unit. Our team this year consisted of five officers R.A.M.C., five assistant surgeons, and one nursing orderly. (The names of the team are under the photograph.)

"In the first round we met a team from Nos. 4 and 8 Mountain Battery, R.G.A. This was a tough match and they were one goal up when we changed ends; however, we managed to get two in the second half. In the second round we met the 2nd Battalion Somerset Light Infantry. We all played a very scrappy and inferior game. The result was a draw (no scoring) even after the extra twenty minutes. The game was replayed next day when we won easily by three goals to love. In the semi-finals we met the Staff College "B" team. This was an officers' team which had the misfortune to lose a man in the first five minutes and another in the second half which handicapped them considerably. The score was four to love. In the finals we met the 2nd Battalion Royal Irish Fusiliers, who won the cup in 1911, and have been the runners up in 1912, 1913, and this year. They were also fresh from being the runners up in the 'Green Howards' tournament at Sialkot, where twenty-two teams were entered. We went on to the ground determined to keep our 'end up,' but rather doubtful inwardly of success against such formidable opponents. Every member of our team played at the top of his form, and when the whistle went at the end of seventy minutes' play there had been no scoring. In the first ten minutes of extra time we got a goal and on changing over got another.

"Our numbers to draw on and pick from are naturally very limited. For the first match the surgical specialist had to be squared to let our outside left out of hospital, as he was in with periostitis, the result of a practice match. Also our left back only arrived from Bombay two hours before the first game, sportingly giving up a few days' leave to be present and play. The same team played all the way through the tournament, and it was fortunate no one was damaged as we positively had no one to replace casualties. Thirteen teams were entered for the tournament which is confined to units in the division. Each member of the team received a silver medal. We are thinking of trying to train some of the Army Hospital Corps and enter a team in the Native Army tournament. We have already played one or two ward boys in practice matches, and we think the material is there and only requires teaching and training.

"The photo was kindly taken by Major G. E. F. Stammers, R.A.M.C."

### **SPECIAL RESERVE OF OFFICERS.**

#### **ROYAL ARMY MEDICAL CORPS.**

The undermentioned Captains, Army Medical Reserve, to be Captains, retaining their rank and seniority, dated May 1, 1914: John Findon Murphy; Murray Ross Taylor, M.B.

The undermentioned to be Lieutenants (on probation): Cadet John Alston, from the Glasgow University Contingent Officers Training Corps, dated April 6, 1914; Cadet Charles Robertson McIntosh, from the Glasgow University Contingent Officers Training Corps, dated April 8, 1914; John Cameron, dated April 9, 1914.

Lieutenant George E. Pepper to be confirmed in his rank.

The undermentioned Lieutenants resign their commissions: Vivian R. Smith, M.B., dated May 6, 1914; Henry Robins Borchers, M.B., dated May 13, 1914.

#### **ARMY MEDICAL RESERVE.**

The undermentioned are removed on completion of the period of service prescribed by Article 641, Royal Warrant for Pay and Promotion, 1907: Captain Samuel K. Adams, M.B., dated April 30, 1914; Lieutenant Alfred S. Millard, M.B., dated February 1, 1914.

### **TERRITORIAL FORCE.**

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned officers of the Territorial Force who have been duly recom-



mended for the same under the terms of the Royal Warrant, dated August 17, 1908:—

Lancashire (Fortress) Engineers, Royal Engineers, Surgeon-Major John Wesley Lloyd.

2nd West Lancashire Field Ambulance, Royal Army Medical Corps, Lieutenant-Colonel Thomas Stevenson, M.D.

Officers attached to other units: Major David Middleton Greig, M.B., attached to the 2nd Highland Brigade, Royal Field Artillery; Major Samuel Lodge, M.D., attached to the 6th Battalion The Prince of Wales' Own (West Yorkshire Regiment); Major Thomas Forrest, M.B., attached to the 7th Battalion The Cameronians (Scottish Rifles); Major James Duncan Farquharson (unposted).

### TERRITORIAL FORCE.

#### INFANTRY.

5th (Cinque Ports) Battalion, The Royal Sussex Regiment.—Surgeon-Lieutenant Alfred Alexander resigns his commission, dated May 9, 1914.

#### ROYAL ARMY MEDICAL CORPS.

3rd Lowland Field Ambulance.—Robert Balfour Barnetson, M.B., to be Lieutenant, dated April 29, 1914.

3rd East Lancashire Field Ambulance.—Arthur Morrell Johnson, M.D., to be Lieutenant, dated March 16, 1914.

1st Northumbrian Field Ambulance.—Captain Arthur G. Dunn, M.B., resigns his commission, dated May 13, 1914.

3rd North Midland Field Ambulance.—Supernumerary Lieutenant William Boyd, M.D., is absorbed into the establishment, dated January 21, 1914.

2nd Scottish General Hospital.—Major Francis M. Caird, M.B., F.R.C.S. Edin., to be Lieutenant-Colonel, dated April 9, 1914; Major John D. Comrie, M.B., from the permanent personnel, to be Major, whose services will be available on mobilization, dated April 9, 1914; Captain David James Graham, M.D., from the 3rd Lowland Field Ambulance, to be Captain (Registrar), dated April 9, 1914.

4th Southern General Hospital.—Quartermaster and Honorary Lieutenant William H. Scrase resigns his commission, dated May 6, 1914.

East Lancashire Clearing Hospital.—James Edward Hill Anderton to be Quartermaster with the honorary rank of Lieutenant, dated April 6, 1914.

North Midland Clearing Hospital.—Quartermaster-Serjeant and Acting Serjeant-Major John Thomas Stokes, from the 5th Northern General Hospital, to be Quartermaster, with the honorary rank of Lieutenant, dated May 13, 1914.

Home Counties Clearing Hospital.—Ernest Frederick Masters (late Serjeant, Sussex Yeomanry) to be Quartermaster with the honorary rank of Lieutenant, dated May 6, 1914.

2nd London Clearing Hospital.—John Arthur Monkhouse (late Acting Serjeant-Major, 1st London (City of London) General Hospital), to be Quartermaster, with the honorary rank of Lieutenant, dated March 25, 1914.

#### OFFICERS ATTACHED TO OTHER UNITS.

The following Captains to be Majors: William W. Jones, M.D., dated December 1, 1913; Walter R. N. Smithard, M.B., dated March 17, 1914.

Captain William S. Paterson, M.B., resigns his commission, dated April 29, 1914.

To be Captains: Lieutenant Stanley F. Linton, M.B., dated August 9, 1913; Lieutenant John Graham, M.B., dated November 7, 1913; Lieutenant Charles H. Caldicott, M.B., dated January 22, 1914; Lieutenant Leonard Colebrook, M.B., dated April 3, 1914; Matthew B. Ray, M.D. (late Captain, 5th Battalion, The Prince of Wales's Own—West Yorkshire Regiment), to be supernumerary, dated May 9, 1914.

To be Lieutenants: Harold Seddon, M.B., dated February 1, 1914; Frank Harris White, dated April 17, 1914; Robert Ellis, M.B. (late Cadet, Cambridge University Volunteer Rifle Corps), dated May 9, 1914.

#### OFFICERS TRAINING CORPS.

University of London Contingent, Senior Division, Officers Training Corps: Major Wilmot P. Herringham, 1st London (City of London) General Hospital, serving with the University of London Contingent, Senior Division, Officers Training Corps, is appointed to command the medical unit of that contingent, and is granted the local rank of Lieutenant-Colonel (with the pay and allowances of that rank) whilst so employed, dated April 3, 1914.

**SOUTH WALES MOUNTED BRIGADE FIELD AMBULANCE.**—Serjeant-Major Wing, R.A.M.C., writes :—

“NATIONAL TERRITORIAL CHAMPIONSHIP SPORTS, CARDIFF, JUNE 28, 1913.

“*Riding and Driving Competition, Royal Army Medical Corps (T.F.).*

“The winners of Championship Challenge Cup and four Gold Medals were Lance-Corporal Rudge ; Drivers W. Lewis, A. Hiles, J. Sockett ; Reserve Driver T. Lakin.



**WINNERS OF THE RIDING AND DRIVING COMPETITION.**

Drivers W. Lewis, A. Hiles, J. Sockett, and T. Lakin,  
Lance-Corpl. Rudge, Serjt.-Major Wing, Staff-Serjt. Godsell.

“The strength of the unit is six officers, thirty-one N.C.Os. and men (‘Transport Section), eighty-three N.C.Os. and men (dismounted sections), total, 120.

“This unit is up to its full establishment with the exception of one officer.

“The following football matches were played :—

**“ROYAL ARMY MEDICAL CORPS FOOTBALL CLUB MATCHES 1913-14.**

			For	Against			
R.A.M.C.	v.	Wye Valley	..	4	3	Won	.. Friendly.
..	v.	Byford	..	3	4	Lost	.. League.
..	v.	Burghill	..	5	3	Won	..
..	v.	Pontrilas	..	5	0	..	..
..	v.	Lugwardine	..	1	3	Lost	..
..	v.	Rylands United	..	7	0	Won	.. Jun. Cup, 1st Round.
..	v.	Wye Valley	..	1	0	..	.. League.
..	v.	Pontrilas	..	8	2	..	..
..	v.	Ewyas Harold	..	6	2	..	.. Jun. Cup, 2nd Round.
..	v.	Burley Gate	..	2	1	..	.. League.

	For	Against		
R.A.M.C. v. Stretton United	.. 2	.. 1	.. Won	.. League.
" v. Madley ..	.. 2	.. 1	.. "	.. "
" v. Pembridge ..	.. 2	.. 2	.. Draw	.. Jun. Cup, 3rd Round.
" v. Ledbury ..	.. 1	.. 1	.. "	.. League.
" v. Burghill ..	.. 1	.. 1	.. "	.. "
" v. Stretton United	.. 1	.. 1	.. "	.. Jun. Cup, 4th Round.
" v. " "	.. 7	.. 2	.. Won	.. " 4th Round, replay.
" v. " "	.. 3	.. 0	.. "	.. League.
" v. Madley ..	.. 2	.. 2	.. Draw	.. "
" v. Kington ..	.. 1	.. 1	.. "	.. Jun. Cup, Semi-final.
" v. " "	.. 4	.. 1	.. Won	.. " Semi-final, replay.
" v. Wye Valley ..	.. 5	.. 3	.. "	.. League.
" v. Ledbury ..	.. 4	.. 2	.. "	.. Jun. Cup, Final.
" v. Byford ..	.. 9	.. 0	.. "	.. League.
" v. Burley Gate ..	.. 0	.. 0	.. Draw	.. "
" v. Moorfields United	.. 4	.. 1	.. Won	.. Friendly.
" v. Ledbury ..	.. 1	.. 1	.. Draw	.. League.
" v. Half-day Early Closers	3	.. 1	.. Won	.. Friendly.



SOUTH WALES MOUNTED BRIGADE FIELD AMBULANCE R.A.M.C. (T.F.)  
FOOTBALL TEAM.

- (1) Winners of the Herefordshire Junior Challenge Cup.  
(2) Runners up for the Herefordshire Junior League Championship.

Played	Won	Drawn	Lost	GOALS	
				For	Against
28	.. 18	.. 8	.. 2	94	.. 39

#### QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

*Postings and Transfers.*—Matrons: Miss H. W. Reid, to Colchester, from Aldershot. Sisters: Miss H. Hartigan, to London, from Curragh; Miss M. Davis, to

Curragh, from Aldershot; Miss L. E. Mackay, to London, from Shorncliffe; Miss J. G. Dalton, to Shorncliffe, from Woolwich; Miss F. M. Tosh, to Dublin, from London; Miss H. Stuart, to Royal Arsenal Hospital, Woolwich, from London; Miss M. M. Bond, to London, from Royal Arsenal Hospital; Miss G. S. Jacob, to Dublin, from South Africa; Miss M. M. Blakely, to Cork, from Colchester; Miss E. C. Cheetham, to Woolwich, from Cork. Staff Nurses: Miss J. Todd, to London, from Colchester; Miss E. H. Cole, to Tidworth, from Aldershot; Miss S. L. Bailey, to London, on provisional appointment; Miss G. F. Parkinson, to Devonport, on provisional appointment.

*Promotions.*—The undermentioned Sister to be Matron, Miss M. M. Blakely.

The undermentioned Staff Nurses to be Sisters: Miss M. E. Medforth, Miss J. H. Congleton.

## ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION OF LIEUTENANTS, ROYAL ARMY MEDICAL CORPS AND INDIAN MEDICAL SERVICE, AT THE CLOSE OF THE FIRST SESSION, 1914.

*Hygiene.*—(Written Examination). Thursday, April 23, 1914. From 2.30 p.m. to 5.30 p.m.

(1) Mention the chief causes of wastage in an army in the field. To what extent can such wastage be prevented by the Medical Service? Give the most important ratios by which you would gauge the health of troops in times of peace, and show what influence invaliding has upon the death-rate.

(2) Give the general rules which would serve to guide you in selecting a site for a permanent station in the Tropics, and include in your answer the steps you would recommend for the preparation of the site of which you have approved.

(3) Explain how the soldier is rationed during active service, mentioning to what theoretical standards the daily dietary should conform.

(4) What are the various sources of water supply? Explain in detail the points to which you would direct your attention when selecting the water supply under conditions laid down in Field Service Regulations, Part I., Section 56.

(5) Describe in detail the examination by which you would determine, in a water sample, the total number of organisms which are capable of growing respectively at 22° C. and 42° C.

*Extra question for Captains of the South African Defence Force only.*

What factors influence the production and dissipation of heat in the soldier on the march? (An extra thirty minutes may be taken for this question.)

*Hygiene.*—(Practical Examination). Friday, April 24, 1914. From 10 a.m. to 1 p.m.

(1) State the results which you obtain on qualitatively testing the provided water sample for the presence of acids and bases, including metals.

(2) The sample of cow's milk supplied has been found to contain 0.72 per cent of mineral matter, and to have a specific gravity (corrected) of 1.033. By the Leffmann and Beam method determine the amount of fat present and work out the total solids by means of Richmond's scale. If you conclude that this milk has been sophisticated, state how and to what extent.

(3) A sample of water, of markedly alkaline reaction, gives the following results of chemical analysis, in parts per hundred thousand:—

Free and saline ammonia	..	..	..	..	0.22
Albuminoid ammonia	..	..	..	..	0.14
Oxygen absorbed in two hours at 26° C.	..	..	..	..	1.74
Nitrous nitrogen	..	..	..	..	0.02
Nitric nitrogen	..	..	..	..	0.80
Chlorine	..	..	..	..	7.00
Total solids	..	..	..	..	58.00
Volatile solids	..	..	..	..	18.10
Total hardness	..	..	..	..	32.00
Permanent hardness	..	..	..	..	11.00

What deductions would you draw as to (a) the probable source, and (b) the possible contamination of this water? State the reasons which have led you to those deductions.

*Pathology.*—(Written Examination). Friday, April 24, 1914. From 2.30 p.m. to 5.30 p.m.

(1) What steps would you take to establish a bacteriological diagnosis in an illness clinically resembling undulant fever? The patient is at the twentieth day of his attack.

(2) Contrast the blood picture in ankylostomiasis with that in pernicious anæmia.

(3) A soldier has been four weeks under treatment for gonorrhœa and is now apparently in good health. How will you proceed to ascertain whether he is fit for discharge from hospital?

(4) By what morphological and cultural characters can the bacillus of diphtheria be distinguished from Hoffmann's bacillus?

*Pathology.*—(Practical Examination.) Saturday, April 25, 1914. From 10 a.m. to 1 p.m.

(1) Examine and briefly report upon the broth culture marked with your examination number. Describe the bacteria you find and leave your stained films, properly labelled, beside your microscope.

(2) Stain and examine the blood-film provided and record your opinion as to the nature of the disease of the patient from whom it was prepared. The film is unfixed.

(3) Stain the section provided so as to demonstrate the presence of bacteria. Describe what you find and leave your specimen in focus under your microscope.

(4) Oral examination.

*Military Surgery.*—Monday, April 27, 1914. From 10 a.m. to 1 p.m.

(1) What forces act upon a bullet after it leaves the muzzle of the rifle, and how do they affect its flight?

(2) Describe the appearances presented by the bones of the skull after a perforating small-bore bullet wound at a medium range. Indicate the complications which may be seen in such a case, and describe fully your treatment.

(3) Mention the various forms of injury found in a gunshot wound of the kidney. Give the symptoms, prognosis, and treatment of these injuries.

(4) The femoral artery and vein are both wounded in Hunter's canal by a small-bore bullet. What results may follow? Give the symptoms and treatment of the conditions you describe.

*Tropical Medicine.*—Monday, April 27, 1914. From 2.30 p.m. to 5.30 p.m.

(1) Give the differential diagnosis between amœbic and bacillary dysenteries, and the appropriate treatment for each.

(2) Describe the etiology and symptoms of bubonic plague.

(3) Discuss the etiology and prophylaxis of undulant fever.

(4) Give in detail the treatment you would adopt at the time and subsequently in—

(i) An attack of benign tertian fever.

(ii) A malignant tertian infection with symptoms of coma.

*Organization of Military Hospitals and principles governing Medical Charge of Troops (Military Medical Administration).*—Tuesday, April 28, 1914. From 10 a.m. to 1 p.m.

(1) What are the duties of a medical officer in charge of effective troops when a case of infectious disease occurs in the barracks, quarters, or lodgings which are within his medical charge?

(2) A soldier in one of your wards is suffering from tubercle of the lungs. State what action (i) you, as in medical charge of the case, and (ii) the officer in charge of the hospital, should take.

(3) How are unserviceable surgical instruments replaced?

(4) What entries should be made in a soldier's medical history sheet by the medical authorities?

(5) What are the regulations governing vaccination in the Army?

[N.B.—The following extra question is for the officers of the South African Defence Forces only. 20 marks allotted.]

You are in medical charge of a detachment of troops (including a proportion of the medical corps) in a station where there is no hospital. Explain how you will arrange for their treatment and care when sick.

(An extra thirty minutes may be taken for this question.)



## EXAMINATION OF CAPTAINS FOR PROMOTION TO MAJOR.

*State Medicine.*—(Special Subject. Written Examination.) Monday, April 27, 1914. From 10 a.m. to 1 p.m.

(1) With which of the more common epidemic diseases are apparently healthy human carriers of infection associated? State briefly the kind of examination which you would make for the identification of suspected "carriers" of the respective diseases.

(2) Set out in detail the instructions which you would issue for the disinfection of a barrack-room after occurrence of a case of smallpox.

(3) Give a list of the animal parasites which may be found in meat used as human food. Describe briefly the life history of any two of the species given.

(4) You are required to report as to the suitability, as regards quality, of the water of a shallow well which is available as a source of supply for drinking purposes; indicate the scope of the investigation which you would make before reporting thereon and discuss the relative values of the different lines of investigation.

(5) At what stages in the course of transmission of an application for an Engineer service, which is desirable on hygienic grounds, can representations be most effectively made by administrative medical officers with a view to securing execution of that service?

*Practical State Medicine.*—(Special Subject.) First day, Tuesday, April 28, 1914. From 10 a.m. to 1 p.m.

(1) Report on the quality of the sample of beer supplied, after making an examination which should include qualitative tests for the presence of poisonous metals.

Second Day. Wednesday, April 29, 1914. From 10 a.m. to 1 p.m.

(1) Examine the sample of food powder provided and report on its probable nature and its caloric value per ounce.

*Bacteriology.*—(Special Subject. Written Examination.) Tuesday, April 28, 1914. From 10 a.m. to 1 p.m.

(N.B.—Five questions only to be answered.)

(1) Discuss the relation of amœbæ to tropical dysentery, and describe the organisms concerned. What methods have been adopted for the cultivation of amœbæ and what results have been obtained.

(2) Describe the properties of opsonins, discussing their relations to other anti-substances, and, in the case of enteric fever, state in detail the method by which you would estimate the opsonic index.

(3) What evidence is there as to the identity or otherwise of human and canine Leishmaniasis?

(4) Give a concise account of the life-history and pathological effects of *Filaria medinensis*.

(5) Describe the morphological and cultural characters of the bacillus of tetanus. Give the methods which you would adopt in a case of tetanus to isolate and identify the organism.

(6) Explain clearly how the Bordet-Gengou reaction may be utilized to demonstrate the presence of *Bacillus typhosus* on a crowded plate.

*Bacteriology.*—(Special Subject. Practical Examination.) First day, Wednesday, April 29, 1914. From 10 a.m. to 1 p.m.

(1) (a) The sample of faeces provided is from a pensioner said to be a "germ carrier." Make plate cultures for examination to-morrow. (Poured plates can be obtained on application, the officer stating what medium he requires.)

(b) An organism, isolated from the above sample of faeces, is contained in pure culture in the broth tube (a). Examine it by direct and cultural methods with a view to its recognition to-morrow.

(All plates and culture tubes to be marked with the candidate's examination number.)

(2) Determine the approximate number of bacteria per 1 c.c. of the emulsion in tube (b). Choose your own method of estimation, and leave your preparation in focus under your microscope.

(3) Cut sections from the block provided. Stain, examine, and make a report on what you find, leaving your preparations next your microscope marked with your examination number.

*Bacteriology.*—(Special Subject. Practical Examination.) Second day, Thursday, April 30, 1914. From 10 a.m. to 1 p.m.

(1) (a) Examine the colonies on your plates and carry out any tests open to you in the time at your disposal with a view to their provisional recognition, stating the results of your examination.

(b) State your opinion as to the nature of the organism examined yesterday and put up in differential culture media.

(2) The pathological secretion provided in the capillary glass tube contains spirochaetes. Examine, and state your opinion as to the nature of the contained organisms. Leave your preparation, marked with your examination number, in focus under your microscope.

(3) Stain the unfixed film provided by Leishman's stain and examine for protozoal parasites, reporting what you find.

(4) Oral examination.

*Physical Training, Work, Food, Clothing, and Equipment of the Soldier.*—(Special Subject. Written Examination.) Monday, April 27, 1914. From 10 a.m. to 1 p.m.

(1) Describe the movements of the centre of gravity of the body in walking, and explain their significance in the case of the soldier when marching.

(2) Give in detail the points you would pay attention to when inspecting the footgear of the soldier and write a short criticism of the boots placed before you.

(3) What are the different methods for ascertaining the nutritive requirements of the body? Discuss the value of protein in the animal economy and state the amount you would recommend per head daily for active service in tropical and cold climates respectively.

(4) Describe how you would carry out the inspection of a gymnasium and a class of recruits undergoing a course of instruction in physical training.

(5) What are the conditions which influence the production and dissipation of body heat when the soldier is marching?

*Ophthalmology.*—(Special Subject. Written Examination.) Tuesday, April 28, 1914. From 9 a.m. to 12 noon.

(1) Describe the eye affections which occur in diphtheria.

(2) A man presents himself with a swelling at the upper and inner angle of the orbit; to what different conditions might it be due? State how you diagnose between them.

(3) State in detail how you would treat a patient with a suppurating ulcer of the cornea and hypopyon.

(4) Name three conditions which may give rise to sudden loss of sight, and say how you would differentiate between them.

*Dermatology.*—(Special Subject. Written Examination.) Thursday, April 30, 1914. From 3 to 5 p.m.

(1) Describe in detail the early rashes of syphilis (i.e., before any relapse takes place), giving the eruptions with which they are most likely to be confused and the differential diagnosis in each case.

(2) Give a list of the skin diseases due to invasion by mould fungi, with a short description of each.

*Syphilology.*—(As part of the examination in Dermatology.) (Special Subject. Written Examination.) Tuesday, April 28, 1914. From 10 a.m. to 1 p.m.

(1) Give the diagnosis and prognosis of syphilitic orchitis.

(2) What treatment would you carry out in the case of a child, aged 10 months, suffering from well-marked congenital syphilis?

(3) Discuss the toxic action of salvarsan, with special reference to deaths and so-called neuro-recurrences which have occurred after its administration.

What precautions should be taken to minimize these risks?

(4) State briefly how you would treat a phagedenic venereal sore, complicated by phimosis.

(5) Sketch a course of treatment for a patient suffering from diffuse syphilitic meningitis, affecting principally the base of the brain, with involvement of the facial nerve. Discuss the prognosis in such a case and advise as to future conduct after completion of the minimal course.

(6) A patient who was infected with gonorrhœa six months previously, whom you treated till four months ago with, amongst other remedies, gonococcal vaccine, and who has been free from urethral discharge for four months, consults you on the



wisdom of his marriage within three months. State what tests you would apply before giving an opinion, and the significance of a negative result in the case of each test. (Details of technique are not required.)

*Midwifery and Gynaecology.*—(Special Subject. Written Examination.) Tuesday, April 28, 1914. From 10.30 a.m. to 1.30 p.m.

(1) How do you investigate a case in which the presenting part has not entered the pelvis two hours after the commencement of labour? Indicate the appropriate method of treatment.

(2) How do you ascertain if an infant a week old is thriving?

(3) What are the causes of retention of urine in women? Give the treatment you would adopt in the different cases.

(4) Describe the course of an attack of acute gonorrhœa in a female, with the complications which may arise. Describe the treatment you would adopt.

*Otology, including Rhinology and Laryngology.*—(Special Subject. Written Examination.) Tuesday, April 28, 1914. From 9 a.m. to 12 noon.

(1) Give the causes, symptoms and treatment of the following:—

(a) Suppuration of the antrum of Highmore.

(b) Epistaxis.

(c) Earache.

(2) Give the symptoms, differential diagnosis, and treatment of—

(a) Acute inflammation of the mastoid process.

(b) Laryngeal obstruction.

(3) Describe briefly the syphilitic manifestations affecting the throat (tonsils, fauces and pharynx), and give the differential diagnosis and general principles of treatment.

## ROYAL ARMY MEDICAL COLLEGE.

### DISTRIBUTION OF PRIZES.

THE General Officer Commanding-in-Chief, Eastern Command, Lieutenant-General Sir James Grierson, was good enough to present the prizes, on the close of the 107th Session of the Junior Class, on May 1, 1914. He was supported by the Director-General, Sir Launcelotte Gubbins, and the General Officer commanding the London District, Sir Francis Lloyd. Among the officers who honoured the occasion were: The Chaplain-General, Bishop Taylor Smith; Surgeon-Generals Sir Arthur Sloggett, Sir C. Cuffe, Sir Francis Trevor, Donovan, Whitehead, Evatt, Sir A. Bradshaw, May (Director-General, Royal Navy); Colonel Sir W. B. Leishman; Fleet Surgeon Bassett Smith; and many distinguished members of the profession, including Sir Ronald Ross, Sir Malcolm Morris, Mr. D'Arcy Power, Mr. Barker, Dr. Kenwood, Dr. Fairbairn, Mr. Foulerton, etc.

Colonel Skinner, the Commandant, at the request of the Director-General, reported as follows:—

"This occasion closes the 107th Session of the Junior Class at this college. The first matter for report is that we have had several changes in our teaching staff since the last prize distribution. To our great regret we have lost Colonel Sir William Leishman as Professor of Pathology, but our loss is softened by the knowledge that he is still at hand and engaged in that branch of research which has already made him famous, and further by the knowledge that he is promoted to that higher body, the Advisory Board, which assists the Director-General in matters relating to our educational arrangements here, and I must take this occasion to inform you and for congratulating him upon the fact that he has just been made a Fellow of the Royal College of Physicians, London. His place here has been taken by his Assistant Professor, Major Cummins, who has been long conversant with our teaching, and whose name is already known in the scientific world. The promotion of Major Cummins to the professorial chair is therefore welcomed heartily by us; and the vacancy created by his promotion is ably filled by Captain A. C. H. Gray, who has made a name for himself in pathological research in Uganda and elsewhere.

"Another loss has been Major Fawcus, who worthily filled the post of Assistant Professor of Hygiene, and who has been promoted to the post of Instructor at the

School of Army Sanitation at Aldershot. Major Fawcus is an instance of the happy combination of the highest scientific attainments with brilliant sporting capabilities, for he is one of the finest cricketers in the Army. Major P. S. Lelean has taken his place here as Assistant Professor of Hygiene. His name is well known to the Corps as an enthusiastic and accomplished sanitarian.

"Another point for notice is that the name of Captain H. M. J. Perry has been inscribed on the Roll of Honour in our lecture theatre, he having gained the highest total of marks during the last senior course.

"And I must congratulate ourselves upon the approaching accomplishment of the promise of the late Secretary of State for War on an occasion similar to this a year ago, that is of a squash racquet court which is very nearly completed.

"The more especial subject of to-day is the completion of the junior class of instruction, composed of eleven officers on probation for the R.A.M.C., one for the Life Guards, and twenty for the Indian Medical Service, and four officers of the South African Defence Force, whom we have been very gratified and proud to welcome among us.

"For the information of those who are not aware of the conditions of army medical service I may observe that these gentlemen are fully qualified medical men before they enter this college as successful candidates after severe competitive examination. The course of instruction here has been in subjects which bear especially upon the health and training of the soldier, upon diseases of tropical climates and their pathology, and upon those principles of surgery which require special study in relation to war. It includes also study of the method of administration of hospitals.

"Many of this class had been seconded to hold appointments in civil hospitals before they came here; some had held such appointments before they passed the competitive entrance examination. All the class have now gone through our army course, which has opened up an entirely new field of work. I need hardly say that this new field has involved for them a special mental effort. It is comparatively easy to pursue a well-accustomed road; to break forth on a new one calls for fresh vigilance and energy, and I must remark that some of these officers have shown conspicuously the qualities necessary to ensure success in their new line. The marks gained here are added to those gained on their admission, with the result that some have changed their relative positions; and this was to be expected, knowing as we do the variations in receptivity displayed by all mankind. And now, before proceeding to read the list of prize-winners, I should remark that these prizes are open only to the R.A.M.C. and I.M.S., in accordance with trust deeds on which they are founded. Were it otherwise the Parkes prize in hygiene would have gone to Captain Welsh, S.A.D.F., with 174 out of 200. He is to be congratulated on having done a remarkably good examination, not only in hygiene, but in all the other subjects."

The following are the prizes and the winners:—

The Herbert Prize (highest total): Lieutenant A. Watson, R.A.M.C., 569 out of 700. *Prox. acc.*, Lieutenant N. V. Lothian, R.A.M.C., 534 out of 700.

Hygiene: Parkes Memorial, Lieutenant N. V. Lothian, R.A.M.C., 168 out of 200. 2nd, De Chaumont, Lieutenant A. Watson, R.A.M.C., 158 out of 200. *Prox. acc.*, Lieutenant D. W. Rintoul, R.A.M.C., 154 out of 200.

Pathology: 1st, Fayer Medal, Lieutenant B. F. Beatson, I.M.S., 173 out of 200. *Prox. acc.*, Lieutenant K. V. R. Rao, I.M.S., 171 out of 200. 2nd, Tulloch Memorial Medal, Lieutenant A. Watson, R.A.M.C., 167 out of 200. *Prox. acc.*, Lieutenant P. D. Warburton, R.A.M.C., 159 out of 200.

Surgery: 1st Montefiore, Lieutenant R. V. R. Rao, I.M.S., 84 out of 100. 2nd Montefiore, Lieutenant A. Watson, R.A.M.C., 82 out of 100.

Tropical Medicine, Randal Martin Gold Medal: Lieutenant J. G. O. Moses, I.M.S., 80 out of 100. *Prox. acc.*, Lieutenant A. Watson, R.A.M.C., 75 out of 100.

Administration: Marshall Webb Medal, Lieutenant N. V. Lothian, R.A.M.C., 93 out of 100. *Prox. acc.*, Lieutenant A. Watson, R.A.M.C., 87 out of 100.

General Grierson then distributed the prizes, and addressed the lieutenants on probation, telling them that they were joining one of the finest branches of the Army, wherein they would be officers. Their first duty in the Service was as officers, and as officers they should work in the best interest of the Empire. Their branch of the Service had developed more than any other within recent years. If they studied what had happened in the big wars such as the Crimean and the South African, they would appreciate what an amazing advance had taken place. In the Crimean days there was no organization in the medical service. There were lots of doctors but no organization. Now there exists an enormous organization, which extends to the Territorial medical

service, and auxiliary associations, embracing every branch of medical, ambulance and nursing work, all requiring technical instruction and special training. They must remember that first they were soldiers and officers of the King. They had in addition the professional and technical side of their work. This combination of duties meant hard work, but it was only by hard work that they could hope to advance.

The Director-General having thanked Sir James Grierson, an adjournment was made to the mess, where the officers of the Corps were "at home."

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## ROYAL ARMY MEDICAL CORPS OFFICERS' BENEVOLENT SOCIETY.

THE Annual General Meeting of the subscribers to this Society will be held in the Library of the Royal Army Medical College, Grosvenor Road, S.W., at 3 p.m., on Monday, June 15, 1914. The Director-General will preside.

It is hoped that officers will freely express their views on any point connected with the Society. Subscribers who wish for information on any special point are requested to communicate with the Secretary, so that information may be furnished in response to any question asked.

124, Victoria Street, S.W.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*  
*Secretary.*

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## ROYAL ARMY MEDICAL CORPS FUND.

NOTICE OF THE TWELFTH ANNUAL GENERAL MEETING, 1914.

THE Annual General Meeting of the subscribers to this Fund will be held in the Library of the Royal Army Medical College, Grosvenor Road, S.W., at 2 p.m., on Monday, June 15, 1914. The Director-General will preside.

It is hoped that officers will freely express their views on any point connected with the Fund. Subscribers who wish for information on any special point are requested to communicate with the Secretary so that information may be furnished in response to any question asked.

124, Victoria Street, S.W.

F. W. H. DAVIE HARRIS, *Lieutenant-Colonel,*  
*Secretary.*

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## ANNUAL DINNER.

THE Annual Dinner of the Officers of the Royal Army Medical Corps will take place on Monday, June 15, 1914, in the "Empire and Alexandra Rooms," Trocadero Restaurant, Piccadilly Circus, W., at 8 o'clock. President: The Director-General, Army Medical Service.

The price of dinner tickets to subscribers will be 7s. 6d. The price to non-subscribers will be £1 12s. 6d. It is particularly requested that early application for tickets be made, both by subscribers and non-subscribers, in order that the number attending may be approximately known as soon as possible. Non-subscribers when applying for tickets should forward the sum of £1 12s. 6d. by cheque or P.O.O., made payable to the Hon. Secretary. The price of the dinner ticket will be collected from subscribers at the restaurant on the night of the dinner.

The following officers will be regarded as subscribers:—

(1) All existing subscribers to the old Royal Army Medical Corps Dinner Fund, provided they have paid their subscriptions to that fund for the current year.

(2) All subscribers to the Royal Army Medical Corps Fund,<sup>1</sup> provided their subscriptions are credited to the fund before the date of the dinner.

Selected musicians from the Royal Army Medical Corps Band will perform during dinner.

Besides one long table there will be small separate tables to allow of eight officers sitting at each, and these will be reserved for parties of eight officers who wish to dine together, if they will arrange to notify the names to the Hon. Secretary before Thursday, June 11.

A plan of the tables will be on view at the restaurant on the day of the dinner, in order that officers who have not made up parties may select the places at which they wish to sit. A list of officers who have notified their intention of dining will also be on view. Miniature medals will be worn.

N.B.—The Monday in Ascot Week has been fixed as the day on which the dinner will be held each year.

G. B. STANISTREET, *Lieut.-Colonel, R.A.M.C.,*  
*Hon. Secretary R.A.M.C. Annual Dinner Committee,*

*c/o Messrs. Holt and Co.,*  
*3, Whitehall Place, S.W.*

## ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND.

SUMMARY OF THE PROCEEDINGS OF THE NINETY-NINTH ANNUAL GENERAL MEETING OF THIS SOCIETY HELD AT THE ROYAL ARMY MEDICAL COLLEGE ON TUESDAY, MAY 19, 1914.

### *Present.*

Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., Director-General, President, in the Chair.

Surgeon-General W. S. M. Price, Vice-President.

Deputy Surgeon-General W. G. Don, Vice-President.

Surgeon-General Sir Charles Cusle, K.C.B.

Colonel W. H. Horrocks.

Colonel Sir William Leishman, F.R.S., LL.D., K.H.P.

Lieutenant-Colonel A. F. S. Clarke.

Lieutenant-Colonel S. Guise Moores.

Lieutenant-Colonel T. W. Gibbard.

Major R. H. S. Fuhr, D.S.O.

Major H. B. Fawcus.

Captain A. A. McNeight, I.M.S. (late R.A.M.C.).

The notice in the *Times* convening the meeting was read.

The Minutes of the Annual General Meeting of May 27, 1913, were confirmed.

The Annual Report, Statement of Accounts and Balance Sheet (which were published in the May issue of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS) were adopted.

Messrs. Deloitte, Plender, Griffiths and Co., were appointed auditors for 1914.

Five vacancies on the Committee were filled by the re-election of Lieutenant-Colonel T. W. Gibbard and by the election of Surgeon-General H. R. Whitehead, C.B., Lieutenant-Colonel M. P. Holt, D.S.O., Major E. T. F. Birrell, and Major R. S. H. Fuhr, D.S.O. as members.

The re-election by the Committee, under Rule XXI, of Captain J. T. Clapham as Secretary of the Society for a further period of five years, from April 1, 1914, at the same salary and office allowance as at present, was confirmed.

Surgeon-General Sir Arthur Sloggett, C.B., C.M.G., K.H.S., having been admitted an Honorary Member of the Society, it was resolved unanimously that he be elected President thereof, in the place of Surgeon-General Sir Launcelotte Gubbins, K.C.B., M.V.O., K.H.S., who resigns office.

<sup>1</sup> Officers who have especially excluded the annual dinner in the allocation of their subscription will, of course, be excepted.

The question having been discussed of whether it is desirable that members of the Society whose annual subscription exceeds £10 should be given the option of paying such subscription by equal half-yearly instalments, the Secretary was directed to send a letter to all members of the Society asking whether they were in favour of this proposal.

The meeting closed with a vote of thanks to the Chair.

20, Belgrave Road, S.W.

J. T. CLAPHAM, *Captain,*  
*Secretary.*

## ROYAL ARMY MEDICAL CORPS CENTRAL MESS AND GAMES COMMITTEE.

THE Annual General Meeting of subscribers to the Central Mess Fund will be held in the Library of the Royal Army Medical College on Monday, June 15, 1914, following that of the R.A.M.C. Fund.

### AGENDA.

- (1) The Minutes of the Annual General Meeting of June 16, 1913, to be read and confirmed.
- (2) To receive the Balance Sheet and Report for the year ended February 28, 1914. (These will be found on pp. 165 to 167).
- (3) To consider the following recommendations of the Committee as to the conditions of membership and subscription to the Central Mess Fund:—
  - (a) That all officers joining the Corps after March 1, 1914, may become subscribers to the Central Mess Fund by paying an entrance fee of £5 5s., and thereafter an annual subscription equivalent to one half of one day's pay of their rank and service, at British rates, on March 1, on which date their subscriptions shall be due in advance. The entrance fee to be paid during the first three months of an officer's service, either in one sum or by equal monthly instalments.  
(The above proposal is based on the fact that at present a young officer pays £2 on joining the London Mess, £2 16s. at Aldershot, and afterwards joining contributions to other messes at home and abroad).
  - (b) That all other officers on the active, half-pay, and retired lists shall become members on payment of the above mentioned annual subscription only.  
(This is a restatement, for the sake of clearness, of resolutions adopted at the Annual General Meetings in 1912 and 1913. With reference to the latter it may be mentioned that the resolution was worded, "That officers on the retired and half-pay lists be eligible to subscribe to the Fund, and that their annual subscription be at the rate of one half of one day's retired or half-pay of their rank. That established messes be invited to accord the privilege of honorary membership to such subscribers.")
  - (c) That in future quartermasters be considered honorary members of the Central Mess Fund without payment of an annual subscription.
  - (d) That officers subscribing as above and the honorary members there mentioned, be relieved of all joining contributions to messes (including those paid on promotion), the payment of such to be a charge on the Central Mess Fund.
  - (e) That the above payments from the Central Fund take place, retrospectively, as from March 1, 1914. Such joining contributions as may have been paid to messes between that date and the adoption of these resolutions will be refunded to subscribers, through the honorary secretaries of the various messes.
  - (f) Members of the present class of lieutenants (on probation) who have not paid the above entrance fee will be relieved of joining contributions in future, other than that now payable to the Aldershot mess).
  - (f) That, as a tentative measure, such payments from the Central Fund be made quarterly on requisition by the honorary secretaries of the various messes.
  - (g) That no increase in the rates of joining contributions to messes existing on March 1, 1914, be made without reference to the Central Mess Committee.
  - (h) That the case of messes which impose no joining contributions be specially considered.
- (4) To consider a recommendation of the Committee that the institution of a separate fund for the furtherance of games and athletics is essential. That this fund

be called the Games Fund and be subscribed to by both officers and men. That the most satisfactory way of starting such a fund (from which the Army Athletic Association subscription would be paid) is to draw upon two sources:—

- (i) The R.A.M.C. Fund, if authority could be obtained for the diversion of a small amount annually (say £25) from this fund.
- (ii) Contributions from the various R.A.M.C. companies stationed at home.

(In answer to a question as to whether they were prepared to join in a general Corps subscription to the Army Athletic Association, nineteen of twenty-six companies expressed their willingness to do so. The report of a sub-committee on the above matter will be found in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for May.)

- (5) The Committee submit for the consideration of the General Meeting the question whether payment or part payment of travelling expenses be granted from the Central Mess Fund to members of Committee when attending meetings.

J. T. CLAPHAM, *Captain,*  
*Hon. Secretary.*

3, Homefield Road,  
Wimbledon Common, S.W.

#### REPORT OF R.A.M.C. CENTRAL MESS AND GAMES COMMITTEE.

The Committee thinks that the state of the Central Mess Fund at the end of the first year of its existence may be regarded as highly satisfactory. The total number of subscribers is 753, or three-fourths of the officers of the Corps (at present date they number 820). Some 75 others have expressed their willingness to subscribe, but have not yet done so. The income and expenditure of the Fund will be found below. The Committee would draw special attention to the public-spirited action of the members of the late R.A.M.C. Mess at Tempe, O.F.S. Not only did they place at the disposal of the Committee certain articles of plate (which have been allocated to the messes at the Curragh, Woolwich, and Peshawar) but they also transferred to the Central Fund their credit balance of £76 12s. 6d. The Committee appreciates most highly the spirit which prompted this generous gift and created a precedent which it is hoped will be followed should at any time some other mess be obliged to close.

As regards the expenditure of the Fund a grant of £50 was made to Peshawar, which had lost, through burglary, valuable property which it was difficult for a small mess to replace. A condition of the grant was that the mess property be fully insured. Eighty pounds was voted to Netley for the repair of furniture after careful consideration of estimates. The Committee satisfied itself that the upkeep of this mess, in a manner creditable to the Corps, had involved for several years past a heavy annual charge on the small number of officers now stationed there.

A small grant of £6 10s. was made to the Camp of Instruction Mess at the Curragh to cover unexpected expenses on closing.

The request of the Aldershot Mess Committee for a loan of £75 towards equipping the Camp Mess at Bordon was agreed to. It is understood that this mess has been very well run at an extremely moderate rate, and that no difficulty was experienced in repaying the £15 instalment of the loan.

During the current year £100 has been granted to the new mess at the Curragh towards providing additional furniture, and the purchase of a camp canteen, which will remain the property of the Fund, has been sanctioned for the Scottish Command.

It will be seen from the statement of accounts that there are no grounds for the idea, which it is believed still exists amongst a certain number of officers of the Corps, that the Central Mess Fund is drawn upon to pay for the entertainment of guests at the Headquarters Mess in London. On the contrary, the considerable expense connected with the entertainment of the delegates to the International Medical Congress last year was borne entirely by the members of the London Mess.

At the last Annual General Meeting the Committee was directed to inquire into the question of the abolition of joining contributions to messes as far as subscribers to the Central Mess Fund were concerned. As a result of this inquiry it feels confident that there is a widespread feeling throughout the Corps in favour of such contributions being paid by the Central Fund, and therefore places recommendations to that effect on the Agenda List. The Committee would point out that the question of imposing in future an entrance fee, payable to the Central Mess Fund, on all officers joining the Corps who wish to subscribe to this Fund is financially associated with the payment, in return, by the Fund of joining contributions to messes. It is estimated that this payment will absorb considerably more than half the total income of the Fund,

# ROYAL ARMY MEDICAL CORPS CENTRAL MESS FUND.

STATEMENT OF ACCOUNT AND BALANCE SHEET FOR THE YEAR ENDED FEBRUARY 28, 1914.

<i>Current Account.</i>		<i>Cr.</i>	
<i>Dr.</i>			
<b>RECEIPTS.</b>		<b>PAYMENTS.</b>	
1913	£ s. d.	1913	£ s. d.
Mar. 1. To Subscriptions (as detailed list subjoined)	433 1 6	By Cheque Book .. .. .	0 2 1
" Balance of Special Mess Fund transferred by the Director-General to the Central Mess Fund .. .. .	82 2 6	" Loan to Committee, R.A.M.C. Mess, Aldershot, for equipment of Mess at Bordon Camp of Instruction .. .. .	75 0 0
" Balance of the late Tempe Mess Fund transferred by Members .. .. .	76 12 6	" Grant to Camp of Instruction Mess at the Curragh .. .. .	6 10 0
" Repayment of first instalment of loan to Aldershot Mess Committee .. .. .	15 0 0	" Grant to R.A.M.C. Mess, Peshawar, to replace losses by burglary .. .. .	50 0 0
		" Hon. Secretary, refund of expenses incurred by him, June, 1912, to February, 1914, viz. :—	
		Postages .. .. .	£4 11 11
		Printing and Typing .. .. .	7 10 6
		Shorthand Reporter .. .. .	1 1 0
		Stationery .. .. .	1 13 1
		Repair of article from Tempe Mess .. .. .	0 3 9
		" Grant to R.A.M.C. Mess, Netley, for repair of furniture .. .. .	15 0 3
		1914	
		Feb. 28. Excess of Receipts over Expenditure	80 0 0
			380 4 2
			<u>£606 16 6</u>
<b>Balance Sheet.</b>		<b>Cr.</b>	
<i>Dr.</i>			
1914	£ s. d.	1914	£ s. d.
Feb. 28. To Balance outstanding of Loan to Aldershot .. .. .	60 0 0	Feb. 28. By Balance .. .. .	440 4 2
" Cash at Bank .. .. .	380 4 2		
	<u>£440 4 2</u>		<u>£440 4 2</u>
1914			
Mar. 1. .. Balance .. .. .	440 4 2		
Audited and found correct, EDMOND T. GANN.		J. T. CLAPHAM, <i>Captain,</i> <i>Hon. Secretary.</i>	
May 7, 1914.			



leaving a comparatively small amount for other purposes. The additional income derived by the Central Fund from entrance fees would largely make up for this expenditure. At present the young officer pays £2 on joining the London Mess, £2 16s. in Aldershot, and possibly a third contribution if he joins another mess at home, so that the proposed initial expense to him will not be greater than heretofore. In the days when the probationary officer drew 8s. a day, and the newly commissioned one 11s., the joining contribution at Netley was £5 5s., and at Aldershot the same as at present.

It may not be out of place to mention that every Royal Engineer officer on joining at Chatham contributes thirty days' pay, and thereafter an annual contribution of one day's pay, whether stationed at Chatham or not.

The Committee was also instructed to promote, as far as possible, the interest of the Corps in games, especially in the matter of inter-regimental competitions. Its efforts to this end have been mainly in the obtaining and spreading of information on various matters. Details of the doings of the Corps in various games and branches of sport have been recorded in the CORPS JOURNAL month by month. It is considered that the formation of a Games Fund, by means of which the credit of the Corps may be kept up in various ways, is very desirable, and a recommendation to that effect will be found in the Agenda List.

S. GUISE MOORES, *Lieutenant-Colonel,*  
*Chairman.*

#### LIST OF SUBSCRIBERS FOR THE YEAR ENDED FEBRUARY 28, 1914.

Surgeons-General Anderson, Babbie, Corker, Gubbins, Sir L., Hathaway, Kenny, MacNeece, Robinson, Sloggett, Sir A., Whitehead.	10 at £1 10s.	£15	0	0
Colonels Birrell, W. G., Butt, Culling, Faunce, Firth, Geddes, Irwin, Johnston, Jencken, Kirkpatrick, Lucas, Lynden-Bell, Leishman, Sir W., Macpherson, Nichol, O'Keeffe, O'Donnell, Pike, Porter, Sawyer, Skinner, Treherne, Woodhouse.	24 at £1 2s. 6d....	27	0	0
Colonel Bedford (H.P.).	1 at 14s. 9d. ....	0	14	9
Lieutenant-Colonels Adams, Allen, Burton, Cree, G., Cree, H., Daly, J. H., Elkington, Ferguson, N. C., Fletcher, Gordon, Gordon-Hall, Green, Haines, Hall, Hearn, Henderson, Hunter, Jones, F. W., Kennedy, Lilly, Macleod, Maher, Manders, Meek, Melville, Nash, Philson, Reilly, Rowan, Russell, M. W., Shine, Sloggett, Starr, Sutton, Swan, Thompson, Turner, Wilson, Windle, Yarr.	40 at 17s. 6d. ....	35	0	0
Lieutenant-Colonels Adamson, Austin, Barefoot, Bate, Beach, Beveridge, Blenkinsop, Bray, G. A. T., Bray, H. A., Bullen, Clark, S. F., Condon, Connor, Copeland, Davidson, Elliott, Fallon, Ferguson, J. D., Forde, Gerrard, Gibbard, Girvin, Graham, W. A., Gray, Halloran, Hardy, F. W., Hassard, Holyoake, Inniss, Julian, Knaggs, Lane, La Quesne, Lavie, Luther, McCulloch, MacDonald, C. J., Macdonald, S., McLoughlin, Marks, Mawhinny, Moores, Morgan, F. J., Morgan, J. C., Newland, O'Callaghan, Pilcher, Pocock, Rawnsley, Russell, J. J., Shanahan, Smith, F., Smithson, Stone, Thompson, J., Thurston, H. C., Way, Whaite, Whitestone, Will, Winter, Wright, Young, C. A. Majors Alexander, Begbie, Beyts, Buist, H. J., Buswell, Crawford, G. S., Dalton, Dunn, H. N., Hardy, W. G., Hennessy, Hinge, Jameson, Jones, T. P., Lawson, Lewis, R. C., McCarthy, McDermott, McNaught, Mangin, Mansfield, Martin, Mitchell, Moore, G. A., More, Morphew, Pollock, Powell, Read, Robinson, Samman, Slayter, Stanistreet, Tate, Taylor, Thompson, Thurston, H. S., Tyacke, Withers.	101 at 15s. ....	75	15	0
Majors Addams-Williams, Anderson, Archer, Barnett, Barrow, Birrell, E. T. F., Bliss, Boyle, Brown-Mason, Campbell, J. H., Carter, Clark, E. S., Clarke, T. H., Clements, Cochrane, Collingwood, Collins, Cummins, S. L., Dansey-Browning, Evans, P., Fleury, Forrest, Fowler, Fox, French, Fuhr, Goodwin, Grattan, Grech, Green, S. F., Gwynn, Hall, Harrison, W. S., Harvey, D., Hewetson, Hooper, Inkson, Keble, Killory, Lawson, D., Lowsley, McCarthy, MacDougall, Mackessack, McMunn, Macpherson, Marriott, Martin, Master, Morgan, Morris, Nickerson, Norrington, O'Grady, O'Gorman, O'Flaherty (2 years), Penny, Poe, Profeit, Prynn, Rattray, Riddick, Smith, L. F., Spencer, Staddon, Stallard, Stammers, Steel, Statham, Thom, Tibbits, Walton, Wanhill, Ward, Waring, Watts, Young, A. H.	78 at 13s. ...	50	14	0

- Majors** Adye-Curran, Anderson, Archer, Ashe, Aylen, Babington, Bartlett, Bateman, Beatty, Bennett, W. L., Biggam, Blackwell, Black, Bostock, Brackenridge, Bransbury, Brunskill, Buller, Burke, Chopping, Churton, Clarke, J. B., Connolly, Cowan, Cowey, Crawford, V., Croly, Cumming, Cunningham, Cuthbert, Davidson, Delap, Dorgan, Douglas, H. E., Douglass, P. C., Ellery, Elsner, Ensor, Evans, C. R., Falkner, P. H., Fawcus, Fell, Fielding, Fitzgerald, Fleming, Foster, Foulds, Furnivall, Gallie, Gibson, Gill, Goddard, Goldsmith, Hamilton, Harrison, L. W., Hartigan, Harvey, F., Haffernan, Hewitt, Hime, Hodgson, Houghton, Howley, Humphry, Hunt, Hyde, Irvine, Jameson, A. D., Johnson, J. T., Kennedy, Knox, Langstaff, Lauder, T. C., Lauder, F. P., Leake, Lelean, L'Estrange, Lloyd, L. N., Lloyd, R. H., McDonnell, Mackenzie, MacLaughlin, McLennan, Mainprise, Mitchell, Myles, Norman, O'Reilly, Ormsby, Packer, Palmer, Parkes, Parry, Pinches, Popham, Potter, Powell, E. W., Powell, J., Prescott, Purser, Riach, Richards, Ritchie, Rowan-Robinson, Scott, Sewell, Shea, Sheehan, Siberry, Smith, S. B., Sparkes, Spiller, Stephens, Straton, Tobin, Unwin, Walker, Waters, Webb, Weld, West, Weston, Williamson, Wilson, Winder, Wingate, Winkfield, Windsor, Woodley, Woodside, Worthington, Sir E., Wroughton. 132 at 11s. 9d. ... £77 11 0
- Major** Hyde, P. G. Captains Ahern, Ainsworth, Bagshawe, Balck, Beaman, Bell, J. G., Bramhall, Bridges, Browne, W. W., Brown, G. H., Carmichael, D. G., Carmichael, J. C., Clarke, F. A. H., Coates, Conway, Craig, Crawford, J. M., Crossley, Duguid, Dunbar, Ffrench, Foster, R. L., Gatt, Harding, N. E., Harding, D. L., Harty, Harvey, W., Hayes, Holden, Hughes, Irwin, Kelly, H. B., Kelly, W. D., Lambert, Long, McKenzie, Meldon, Pennefather, Rogers, Seecombe, Smallman, Stack, Tyndale, Walker, Webster, Winder, Wood. 48 at 10s. 6d. ... 25 4 0
- Captains** Ahern, Anderson, J. H., Anderson, R. G., Archibald, Arthur, Anthonisz, Benson, W., Blackwell, Bond, Booth, Bowle, Bryden, Byam, Campbell, J. H., Carter, H., Cathcart, Churchill, Connell, Coppinger, Corder, Cromie, Cummins, A. G., Davy, Dawson, A., Dill, Doig, Douglass, J. H., Drew, Dunkerton, Dunne, Dwyer, Edmonds, Edwards, G. B., Egan, Emerson, Fairbairn, Fawcett, C. E., Fawcett, H. H., Ferguson, Forrest, Fraser, A. N., Frost, Galwey, Garland, Gater, Gibson, I., Grant, Gray, A. C. H., Hallowes, Hannafin, Harding, Harvey, G. A., Hastings, Hildreth, Hoar, Hole, Honeybourne, Howell, F. D., Humphrey, Jevors, Johnson, V. G., Johnstone, G. P., Kempthorne, Lewis, G. E., Lewis, R. P., Lewis, R. R., Lithgow, Littlejohns, Lloyd-Jones, Low, Lynch, McConaghy, MacDowall, McEntire, MacNicol, Marett, Maughan, Maydon, Millar, Morris, Moss, O'Brien, O'Grady, Ommanney, O'Neill, Otway, Paine, Painton, Powell, Rahilly, Rees, Richard, Richmond, Ritchie, Roberts, Robinson, Rose, Ryley, Sampson, F. C., Sampson, P., Scatchard, Sherren, Sidgwick, Sinclair, Smyth, Stewart, Sutcliff, Sylvester-Bradley, Tabuteau, Tate, Thompson, R., Thomson, D., Turner, Vaughan, Vidal, Ware, Watson, Weston, Wetherell, White, C. F., White, R. K., Wiley, Williams, Wilson, Winckworth, Wright, Wyatt. 127 at 8s. 6d. ... 53 19 6
- Captain** Farrant, P. 1 at 8s. 9d. ... 0 8 9
- Captains** Amy, Bennett, J. A., Benson, C., Boyd, Bracken, Bradish, Buist, Byrne, Browne, T. W., Carruthers, Casement, Cassidy, Chapman, Clark, J. A., Clarke, C., Comyn, Conyngham, Cooke, Corbett, Cunningham, F., Dalglish, Davies, A. H. T., Dawson, G. F., Dickenson, Dickson, H. S., Dickson, T. H., Dickson, R. M., Dive, Dowling, Dykes, Edwards, H. R., Ellcome, J. E. (2 years), Elliott, E. J., Elliott, A. C., Elvery, Eves, Farebrother, Field, P. C., Foster, J. R., Gall, Gibbon, Gibson, H., Gibson, H. G., Gregg, Gurley, Hannafin, Harding, C. E., Hart, H. P., Hart, J. C., Hayes, Hendry, Heslop, Hingston, Howell, H. L., Irvine-Fortescue, Johnson, B., Jones, A. G., Kinead, Kyle, Lambkin, Lane, Langrishe, Leckie, Leeson, Lochrin, Loughnan, Lunn, MacArthur, D. H., MacArthur, W. P., Macarthy, McCombe, McCreery, McGrigor, Mackenzie, McNeill, McSheehy,

Manifold, Marshall, Mathieson, Middleton, Mitchell, T. J., Mitchell, W., Murphy, Nicholls, O'Brien-Butler, O'Connor, O'Farrell, O'Keeffe, O'Kelly, O'Riordan, Paris, Parkinson, Parsons-Smith, Perry, Phelan, Priest, Purdon, Ranken, Rennie, Rigby (2 years), Robertson, Roche, Rudkins, Scaife, Shepherd, Sherlock, Sim, Stack, Stallybrass, Stanley, Startin, Stevenson, A. L., Stevenson, G. H., Stirling, A. D., Stoney, E. C., Stuart, Suhr, Thompson, W., Todd, Tomlinson, Turner, F. T., Varrell, Vaughan, White, Williamson, Wilson, G., Wilson, M. O., Wood, Worthington, Wright, A. R., Wright, W. G., Yourell. 134 at 7s. 9d. ... ..				£51 18 6
Lieutenants Archer, Bissett, Blackmore, Blackie, Bowie, Brett, Bridges, R. F., Buckley, Burnett, Cane, Chambers, Christie, Cowen, E., Davidson, Deane, Finny, Flood, Frobisher, Frost, W. A. (2 years), Fyffe, Gaunt, E. T., Gaunt, J. K., Graham, W. T., Hallinan, Heale, Hood, Hudleston, Ingoldby, Kidd, Laird, Levack (2 years), MacIlwaine, Mallam, Monteith, Osmond, Reynolds, Ritchie, Robinson, Russell, Seaver, Shields, Skrimshire, Stevenson, Stringer, Sykes, Treves, Vivian, Webster, Wells, Weston, With, Wynne. 54 at 7s. ...				18 18 0
Captains and Quartermasters Offord, Short. 2 at 6s. 9d. ... ..				0 13 6
Lieutenant and Quartermaster Smith. 1 at 4s. 6d.... ..				0 4 6
Total ... ..				£433 1 6

NOTE.—The following subscriptions for the past year have been received since its termination :—

Surgeon-General Bruce, Sir D. ... ..	£1 10 0
Majors Carr and Morton ... ..	0 11 9
Captain Skelton ... ..	0 10 6
Captains Burney and Petit ... ..	0 7 9
Lieutenant Porter ... ..	0 7 0

## SUMMARY OF THE PROCEEDINGS OF A MEETING OF THE CENTRAL MESS AND GAMES COMMITTEE HELD ON MAY 11, 1914.

### *Present :—*

Lieutenant-Colonel S. Guise Moores (Aldershot) in the Chair.

Lieutenant-Colonel J. C. Jameson (Woolwich), Major J. R. McMunn (Netley), Major A. B. Smallman (Aldershot), Captain H. B. Kelly (Curragh), Captain A. C. H. Gray (London), Captain S. M. Meadows (Tidworth), Captain W. Benson (Rawal Pindi), Captain R. M. Davies (Pretoria).

Letters regretting their inability to attend were read from Majors G. A. Moore (Chatham), T. F. Fielding (Plymouth), R. W. Clements (Cork), E. H. Myles (Chester), B. B. Burke (Dover), and from Captains G. D. Harvey (London), G. E. Ferguson (York), C. T. Edmunds (Peshawar).

Captain A. C. H. Gray took his seat on the committee as representing London, and Captain R. M. Davies on behalf of Pretoria.

(1) The Minutes of the previous meeting were read and confirmed.

(2) The statement of accounts and balance sheet for the year ending February 28, 1914, were adopted, and payment of the auditor's fee was sanctioned.

(3) Various recommendations to the annual general meeting were considered and embodied in the agenda, which will be found above. With reference to that on the question of payment, or part payment, of travelling expenses of members of the committee, the hon. secretary submitted more details than were available at the previous meeting of the committee. Opinion being equally divided for and against the principle it was decided to leave the matter in the hands of the general meeting.

(4) A grant of £100 was made to the new mess at the Curragh towards the provision of additional furniture and cutlery.

(5) The portion of a grant of £30 to the Woolwich mess for various objects, was deferred, pending a decision as to what arrangements should be made in the case of messes which impose no joining contribution. (Agenda IV. h.)

(6) The Hon. Secretary reported that the loan of £70 which had been made to the D.D.M.S. Irish command for equipping a camp mess at the Curragh had been declined by a sub-committee at that station to which it had been referred by him.

(7) A grant not exceeding £40 was made for the purchase of a camp canteen for the Scottish command, on the understanding that the canteen remains the property of the central mess fund, and that its storage and upkeep is undertaken by the Scottish command.

(8) In reply to a request from Cairo that a grant be made to provide bedroom furniture for an officers' "home," the Hon. Secretary was directed to say that only recognized messes were entitled to assistance from the central fund.

(9) A letter was read from Major S. B. Smith (Belfast) proposing that an annual R.A.M.C. golf competition be held on some course near London on the day of the Corps dinner. Opinions were expressed that this would interfere with the attendance of officers, which was desirable, at the various meetings held on that day, and it was suggested that the following day would be more suitable. Eventually it was decided to refer the matter to the general meeting.

## NOTES ON GAMES AND SPORTS.

*Cricket.*—Our Aldershot correspondent writes: "The cricket season of 1914 has started in a most auspicious way. The Corps undoubtedly has the strongest side that has ever represented it; there is a choice from eight officers and about a dozen N.C.Os. and men. With regard to bowling, Major Fawcus's talent with the ball is so well known that reference to it is quite unnecessary; he is ably backed up by Corporal Mack, who promises to be one of the best bowlers in the Command, and there are several others capable of taking wickets. The batting is strong the whole way through the side, the chief feature being the consistent batting of Major Bostock, who up to date in five innings has collected 297 runs with a highest of 97. The fielding on the whole has not been very good, but it will no doubt show considerable improvement with further practice. The following matches have been played up to date:—

"*Officers v. N.C.Os. and Men.*—This match was played on the Corps ground on Saturday, May 2, in very cold weather. The N.C.Os. and men found Major Fawcus' bowling too much for them, and were all out for 97. The officers made 160 for 8 wickets. Captain Thurston playing well for 51.

"*v. St. Bartholomew's Hospital.*—This match was played on the Corps ground on Saturday, May 9. Bart's had first knock and made 134. Major Fawcus bowled splendidly after lunch, taking 6 wickets for 12 runs. The Corps made 210 for 8 wickets, Major Bostock playing an excellent innings of 88 on a difficult wicket.

"*v. Bordon Garrison.*—Played at Bordon on Wednesday, May 13, in very cold weather. Bordon batted first and could only total 98. Corporal Mack bowled very well, and with the help of Major Bostock, who was in great form behind the sticks, took 8 of the Bordon wickets. Major Fawcus took the other 2 wickets; he was bowling with very little luck else his bag would have been a bigger one. We made 120 odd for 8 wickets; the scoring was very level, Major Bostock being top scorer with 22.

"*v. 1st Royal Berkshire Regiment.*—This match, which was played on the Lower Club ground on Friday, May 15, was much looked forward to, as the Berkshires are one of the strongest side in the Command.

"The Berkshires went in first and made 210, a score which should have been much smaller if it had not been for several lapses in our fielding. We made 145 for 3 wickets. We ought to have made the runs, and would have done if our batting had been a little more enterprising, and if there had been no tea interval.

"*v. Brookwood Asylum.*—Played in glum weather on the Asylum ground on Saturday, May 16. Major Bostock won the toss and put them in, a move which was very successful, as Brookwood were all out for 123 against the bowling of Major Fawcus and Corporal Mack, the former taking 4 wickets and the latter 5. We put together 265, Majors Bostock and Fawcus playing excellent cricket for 97 and 62 respectively.

"*v. Royal Engineers.*—Played on the Royal Engineers' ground on Monday, May 18. The sappers won the toss and took first knock, but could only make 108, Bugler Osborne bowling very well and taking 6 wickets and doing the "hat trick." We however, fared even worse at the commencement of the game, the first 4 wickets

falling for 4 runs, and 6 wickets being down for 20. Majors Bostock and Cochrane, however, playing large-hearted cricket, added over 70 runs for the seventh wicket, Major Bostock making 40, and Major Cochrane 31. This stand was the turning-point of the match. We eventually made 161 for 8 wickets, Corporal Mack and Private Newman treating the bowling with scant respect after they had made the 12 runs necessary to win. It will thus be soon that we have played up to date 5 matches, winning 4, and the fifth being drawn very much in our favour—a record which it is not too much to expect will be kept up for the rest of the season."

*Racing.*—Captain O'Brien Butler has been in great form of late. At present he heads the winning list of amateurs and professionals in Ireland with 9 winners, 1 second, and 2 thirds in 12 successive rides. He won the Irish Grand National, and was second (by half a length) in the Scottish Grand National. His victories are not confined to the United Kingdom as the following extracts from the *Budapesti Naplo* of May 1, 1914, parts of pages 6 and 7 (translation from Hungarian), will show :—

#### "RACING NEWS.

"*Home.*—The Englishman, Captain Butler, unexpectedly appeared in Pressburg this morning. We stated at the time that the English gentleman rider undertook to ride Florestan in the great steeplechase. In the meantime, however, the Ulster revolution broke out and Captain Butler, who is on the active list, was ordered to the seat of war. The Florestan stable was afraid that the horse would be left without a rider and promptly engaged First-Lieutenant Sibrik. Captain Butler, however, applied for leave and having in view the sporting reason, which in England is always considered with respect, he was granted leave. He neither said nor wrote a word but immediately set out and, with true English punctuality, appeared upon the scene. Naturally there is now much excitement in Pressburg; Captain Butler wishes to ride Florestan, but First-Lieutenant Sibrik also adheres to the right which he has acquired. As, however, the two riders cannot both ride the same horse, they will, in the end, have to solve the knotty problem and probably, with Hungarian hospitality, in favour of the foreign gentleman rider. In order, however, that Captain Butler should not in any case have come to Pressburg in vain, Mr. Boleszláv Zangen has been so obliging as to allow him to ride Nestor for the 'Polgár' prize. This incident, moreover, not only demonstrates English trustworthiness and punctuality but is a sign of that polite consideration which is given to the sport of racing in England even by the highest official military circles."

The Austrian paper *Sport* published in Vienna, on May 1, described the race as follows :—

"The Grand Pressburg Steeple Chase for gentlemen riders, 12,000 kr. to the winner, 2,000 kr. to the second horse and 1,000 kr. to the third. Distance 5,000 metres. There were six starters. The race was won by Florestan (Bon-Marché—Floramour), owned by Baron L. Disztay and ridden by Captain O'Brien Butler. Time 7.13 mins. Trainer Geoghegan. Won easily by six lengths; a bad third."

"All kept together at the start, Florestan, Hüseg, and Royal Mail taking the lead in turn. Marmont came to grief at the ditch in the wood and Minca at the hurdle before the grand stand. Soon Again now took the lead from Florestan, Hüseg became distressed and Royal Mail soon followed suit; two hundred metres from the winning post Florestan came away and won with great ease."

Captain O'Brien Butler has sent the following note :—

"There was a big entry for the race, which is looked upon as the Grand National of Austrian racing, but owing to breakdowns and other mishaps only six went to the post and of these Florestan was favourite with Royal Mail and Marmont well backed. The course was in a very pretty situation and was of a sporting character. After jumping two hurdles the next fence was a hedge and ditch into a wood, through the wood and out over a mortared stone wall and then past the stand over three hedges and ditches, down a steep embankment through another wood, down and up another steep embankment through two ploughed fields, at the end of which a fallen and whitewashed tree had to be jumped, down yet another embankment, over another mortared stone wall and then over the same three fences past the stand, hedges and ditches, and lastly once round the hurdle course and finish, the whole course being three miles. A big marble slab outside the weighing room shows the winning owner, horse, and rider of this race, since its institution; and up to date it had not been won by a British rider. Amongst the successful jockeys I noticed Count Kinsky, who won our Grand National at Liverpool on Zoedons (he is now Prince Kinsky)."

"The cup received by Captain O'Brien Butler bears the following inscription : 'Presented by His Apostolic Majesty the King of Hungary.'"

**Rowing.**—Among the crews entered for Henley Regatta this year we note the name of Captain M. P. Leahy, R.A.M.C., as rowing for the Thames Rowing Club. He is rowing 7 in the eight for the Grand Challenge Cup and 8 in the club four for the "Stewards."

**Lawn Tennis.**—It is believed that the Army Lawn Tennis Tournament will be held at Queen's Club on July 8, 9 and 10. Notices will be sent to the various districts when definite information is received. R.A.M.C. pairs enter for the Inter-Regimental Doubles Challenge Cup by Commands.

3, Homefield Road,  
Wimbledon,

May 19, 1914.

J. T. CLAPHAM, *Captain,*  
*Hon. Secretary.*

## ALDERSHOT ROYAL ARMY MEDICAL CORPS ATHLETIC SPORTS.

THE R.A.M.C., Aldershot, Annual Athletic Sports will be held at Aldershot on Thursday and Friday, July 9 and 10, 1914. The following events will be open to R.A.M.C., any station. Points will be allotted for these open events, and the competitor obtaining the highest number of points will be the holder of the R.A.M.C. Challenge Cup (which is kept in the R.A.M.C. Sergeants' Mess, Aldershot).

EVENTS.	PRIZES.		
	1st	2nd	3rd
	s. d.	s. d.	s. d.
*High jump, three tries .. .. .	10 0	5 0	— —
*Long jump, three tries .. .. .	10 0	5 0	— —
*R.A.M.C. Challenge Shield competition, one team per company, teams to consist of four bearers, and to include one N.C.O., not above the rank of corporal .. .. .	60 0	30 0	— —
Challenge Cup bicycle race, two miles .. .. .	20 0	Cup, Medal and 12 6	7 6
Hurdle race, 120 yards, ten flights .. .. .	25 0	15 0	10 0
Flat race, 100 yards .. .. .	25 0	15 0	10 6
The Hunter Challenge Cup flat race, $\frac{1}{4}$ mile .. .. .	25 0	Cup, Medal and 15 0	10 0
Half-mile race .. .. .	25 0	15 0	10 0
The Johnstone Challenge Cup flat race, one mile .. .. .	25 0	Cup, Medal and 15 0	10 0
The Robinson Challenge Cup relay race, one team per company, consisting of four competitors, any rank .. .. .	40 0	Cup, Medal and 20 0	12 0
Half-mile race (open to R.A.M.C., any station, excepting Aldershot) .. .. .	25 0	15 0	10 0

\* Decided on first day, but in any case competitors should be prepared to attend on both days for other events, as if heats are necessary they will be run off on the first day.

With reference to the R.A.M.C. Challenge Shield competition, points will be given in the following proportions:—

Accuracy in applying dressings, etc., 50 per cent.

Gentleness in the handling and carrying of patients, 35 per cent.

Time, 15 per cent.

Methods laid down in R.A.M.C. Training, 1911, to be followed.

Medals to be presented to the winning team.

No material, except such as is supplied in haversacks, to be used.

No clothing to be cut or removed except boots and caps.

No points for winning this event will count in the R.A.M.C. Challenge Cup.

Posters with full particulars will be sent to companies later.

P. DAVIDSON, *Captain,*  
*Hon. Secretary, R.A.M.C. Sports.*

## UNITED SERVICES MEDICAL SOCIETY.

THE Annual General Meeting of the above Society will be held at the Royal Army Medical College, Grosvenor Road, on Monday, June 15, 1914, at 4 p.m.

C. E. CORTIS STANFORD, *Staff-Surgeon, R.N.*

G. A. D. HARVEY, *Captain, R.A.M.C.*

*Hon. Secretaries.*

## WARRANT OFFICERS AND SERJEANTS,' PAST AND PRESENT, ANNUAL DINNER CLUB.

MINUTES OF THE SIXTH ANNUAL GENERAL MEETING OF THE ABOVE CLUB, HELD AT THE SERJEANTS' MESS, GROSVENOR ROAD, LONDON, S.W., ON APRIL 29, 1914, SERJEANT-MAJOR HUNTINGFORD PRESIDING.

(1) Members Present: Messrs. Genese, Gatesman, Bush, How, Serjeant-Majors Cox, Collier, Huntingford, Quartermaster-Serjeant Walker, Staff-Serjeants Court, Ellis, and Serjeant Toye.

(2) Serjeant-Major Huntingford occupied the chair and explained the business before the meeting.

(3) The minutes of the previous meetings were read and confirmed.

(4) The accounts having been duly audited, were read and confirmed. Credit balance in hand £10 2s. 11d. Outstanding liabilities, Band Account, £5; honorarium late Secretary (Staff-Serjeant F. G. Court), £4 4s.

(5) The election of officers for the ensuing year, 1914-1915, to replace those automatically retiring, was then proceeded with. Proposed by Serjeant-Major Collier and seconded by Mr. Bush that Mr. Genese be asked to become Vice-President for the ensuing year. Carried unanimously. Mr. Genese accepted the post.

The following members were elected as the committee:—

Mr. Bush, Mr. Gatesman, Mr. Jackson, Serjeant-Major Collier, Serjeant-Major Huntingford, Quartermaster-Serjeant Walker.

Hon. Treasurer: Serjeant-Major Cox.

Staff-Serjeant Court having stated that he wished to retire from the post of Secretary, it was proposed by Staff-Serjeant Court and seconded by Serjeant-Major Cox that Staff-Serjeant Ellis be asked to take that office. Carried unanimously. Staff-Serjeant Ellis accepted the post.

(6) Proposed by Mr. Bush and seconded by Quartermaster-Serjeant Walker that Staff Serjeant Court be presented with an honorarium of four guineas, as a mark of appreciation of the manner in which he has carried out the office of Secretary. Carried unanimously.

(7) Proposed by Mr. Bush and seconded by Mr. Genese that a hearty vote of thanks be accorded to Serjeant-Major Huntingford on his retirement as Vice-President. This was carried unanimously. Serjeant-Major Huntingford returned thanks, and thanked the committee for their able assistance during the year he was president of the committee.

W. H. ELLIS, *Staff-Serjeant,*  
*Hon. Secretary.*

### NOTICE.

Members are reminded that the annual subscriptions up to and for March 31, 1915, are now due, and the Secretary will be glad to receive subscriptions as early as possible, also names, entrance fees and subscriptions of any new members who wish to join.

All communications, remittances, etc., should be addressed to:—

W. H. ELLIS,  
*Staff-Serjeant, R.A.M.C.,*  
*Royal Herbert Hospital,*  
*Woolwich.*



## CASH ACCOUNT—YEAR 1913-14.

BALANCE SHEET.Digitized by Google

## THE NAVAL AND MILITARY EMIGRATION LEAGUE.

WE have been asked to publish the following letter received from H.R.H. The Duke of Connaught:—

*Government House,  
Ottawa.*

*March 28, 1914.*

Madam,—I am commanded by His Royal Highness the Duke of Connaught to thank you for your letter of March 18, enclosing a copy of the third Report of the Naval and Military Emigration League, which His Royal Highness has read with satisfaction. He is extremely gratified and pleased to see the excellent work which the League has accomplished during the past year, and feels convinced that the number of ex-Service emigrants that have been sent out under the auspices of the League to Canada will prove a valuable acquisition to the Dominion.

Yours faithfully,

(Signed) F. FARQUHAR,  
*Lieutenant-Colonel,  
Governor-General's Secretary.*

*The Secretary,  
N. and M.E. League,  
14, Great Smith Street, S.W.*

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## FOR THE WELFARE OF INFANCY.

WE have received the following notice:—

The Right Hon. Herbert Samuel, President of the Local Government Board, will give the Inaugural Address at the National Conference on Infant Mortality, which is to be held at Liverpool on July 2 and 3. Many important subjects are down for discussion, including milk sterilization, ante-natal hygiene, the teaching of infant hygiene to the elder girls in elementary schools, the scope and functions of schools for mothers, and the special responsibilities of sanitary authorities in regard to infant welfare. A large number of local authorities and voluntary associations for infant welfare have already appointed delegates.

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## OBITUARY.

### LIEUTENANT-COLONEL FREDERICK SAMUEL HEUSTON, C.M.G.

LIEUTENANT-COLONEL F. S. HEUSTON died at Greystones, Co. Wicklow, on March 28, aged 57. He received his medical education at the Carmichael College, Dublin, and obtained the diplomas L.R.C.S.I. and L.M. in 1883, and the F.R.C.S.I. in 1885. He joined the Army as Surgeon, Army Medical Department, in February, 1884. He served in the Hazara Expedition, 1888, and his "most gallant conduct under fire" was brought to notice. In 1894 he was seconded for service under the Chinese Government, and in recognition of his services to the wounded during the war between China and Japan the Emperor of China conferred on him the Insignia of the Imperial Order of the Double Dragon of the Third Class. He also acted as Professor at the Imperial Medical College, Tientsin.

In 1896 he was promoted to be Surgeon-Major, Army Medical Staff. He proceeded to South Africa in 1899 and was present at the relief of Ladysmith, including the action at Colenso; the operations of January 17 to 24, 1900, and action at Spion Kop; the operations of February 5 to 7, 1900, and action at Vaal Kranz; the operations on Tugela Heights and action at Pieters Hill; the operations in Natal, March to June, 1900, including the action at Laings Nek. He was twice mentioned in dispatches, and for his services received the Queen's medal with six clasps, the King's medal with two clasps and the C.M.G.

In 1902 he was seconded for service as Surgeon and Physician of the Royal Hospital, Kilmainham. The Governors of the Hospital recorded their appreciation of the admirable manner in which he performed his duties. His unvarying kindness and

attention coupled with his noted ability earned for him the affection and respect of all.

In 1904 he was promoted Lieutenant-Colonel, Royal Army Medical Corps, and in 1910 was selected for increased pay. He was placed on retired pay in January, 1912.

#### BRIGADE-SURGEON JOHN ALEXANDER SHAW.

BRIGADE-SURGEON J. A. SHAW died at Bournemouth on May 1, aged 72. He was educated in Dublin, and obtained the diploma L.R.C.P. in 1863, the degree of M.D., Queen's University, Ireland, in 1863, and the diploma F.R.C.S.I. in 1868. He joined the Army as Assistant Surgeon, Staff, in September, 1863. In 1864 he was appointed Assistant Surgeon of the 4th Foot. He became Surgeon in the Army Medical Department in 1873, Surgeon-Major in 1876, and retired with the honorary rank of Brigade-Surgeon in 1885. He served abroad in India, South Africa, and Egypt. He took part in the Egyptian Expedition, 1882, being present at the Battle of Tel-el-Kebir. He was mentioned in dispatches and received the medal with clasp, and bronze star. In 1885 he served in the Soudan Expedition, being again mentioned in dispatches.

After his retirement from the active list he held the retired pay appointment at Penally for nearly twelve years.

#### CAPTAIN CHARLES VIVIAN BERESFORD STANLEY.

CAPTAIN C. V. B. STANLEY died at Cairo on March 11, 1914, aged 38. He was born at Armagh on October 16, 1875, and received his medical education at the Dublin University, graduating in 1900. He was employed as a civil surgeon during the South African War, being present at the operations in the Transvaal; operations in the Orange River Colony, 1900; operations in Cape Colony; operations in the Transvaal and Orange River Colony, 1900-01. For his services he received the Queen's medal with four clasps. He joined the Army as Lieutenant, Royal Army Medical Corps, in September, 1902. He was promoted Captain in March, 1906, and retired in October, 1918. He served on the West Coast of Africa from June 3, 1903, to July 17, 1904, and was seconded with the Egyptian Army from January 26, 1906, to the date of his retirement, during which period he saw service in the Blue Nile District, March 17, 1906, to March 30, 1906, and in the Kordofan District from May 2, 1906, to May 13, 1907, receiving the Egyptian medal with clasp.

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### BIRTHS.

DUNBAR WALKER.—At Quetta, Baluchistan, on April 7, the wife of Captain N. Dunbar Walker, R.A.M.C., of a daughter.

DICKINSON.—On April 9, at "Bay View," Dalkey, Co. Dublin, to Captain and Mrs. R. F. Dickinson, a son.

TATE.—On April 25, at Dublin, the wife of Captain R. G. H. Tate, R.A.M.C., of a son.

BLACKMORE.—On May 11, at Mafeking, Bangalore, Southern India, the wife of H. Stuart Blackmore, R.A.M.C., of a daughter. (By cable.)

LATHBURY.—At Chipperfield, King's Langley, on May 11, the wife of Captain E. B. Lathbury, R.A.M.C., of a daughter.

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### DEATHS.

STANLEY.—At Cairo, on March 11, Captain Charles Vivian Beresford Stanley, late Royal Army Medical Corps, aged 38.

HEUSTON.—At Greystones, Co. Wicklow, on March 28, Lieutenant-Colonel Frederick Samuel Heuston, C.M.G., F.R.C.S.I., retired pay, Royal Army Medical Corps, aged 57.

JOHNSON.—At Naini Tal, on March 30, Mary Heron Tyrer, aged 18 months, daughter of Major and Mrs. J. Tyrer Johnson, R.A.M.C.

TRUMAN.—On Monday, April 20, suddenly, at the Military Hospital, Parkhurst, I. of W., Ellen Mallan, the beloved wife of Quartermaster-Serjeant A. C. Truman, Royal Army Medical Corps, and the daughter of the late A. Stratton (senior), of the Royal Naval Hospital, Haslar.

SMITH.—On April 25, at the Strand Palace Hotel, London, of pneumonia, Jane Violet Laing, wife of Colonel F. Smith, D.S.O., R.A.M.C.

SHAW.—At Bournemouth, on May 1, Honorary Brigade Surgeon John Alexander Shaw, M.D., retired, Army Medical Staff, aged 72.

LLOYD.—On May 11, from pneumonia, Louis Percival Moore, the youngest and much beloved son of Surgeon-General Owen E. P. Lloyd, V.C., C.B., and Florence Moore Lloyd, grandson of the late Lady Louisa Morgan, and great-grandson of Stephen Moore, third Earl of Mountcashell, aged 27.

LATHBURY.—At Chipperfield, King's Langley, on May 13, Dorothy Helen, infant daughter of Captain and Mrs. E. B. Lathbury.

## EXCHANGES, &c.

*The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.*

Lient.-Colonel, due for foreign service next Trooping Season, desires to exchange. Apply "Abroad," c/o Messrs. Holt & Co.

Captain, due for foreign service at the end of this Trooping Season, probably February or March, 1915, wishes to exchange with an officer low down on roster. Apply "Curlew," c/o Messrs. Holt & Co., 3, Whitehall Place, London.

Major, due for foreign service Trooping Season 1914-1915, wishes to exchange with an officer low down on roster. Apply "R. N.," c/o Holt & Co., 3, Whitehall Place, London.

Captain I.M.S., 6 years' service, now in England, wishes exchange in the Autumn with R.A.M.C. Officer either just returned from foreign tour or due home next Trooping Season. Moderate premium expected. Apply "I.M.S.," c/o JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, 8, Serle Street, London, W.C.

Lieut.-Colonel due for abroad (probably India) next Trooping Season wishes an exchange for a year. Apply "Paradox," c/o Messrs. Holt & Co., London.

A free issue of twenty-five reprints will be made to contributors of Original Communications, and of twenty-five excerpts of Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates :—

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12 {	4	2 s. d. 0 2 6	2 s. d. 0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25 {	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50 {	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 8				
100 {	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200 {	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

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CASES FOR BINDING VOLUMES.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates :—

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These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

*All Applications for Advertisements to be made to—*  
G. STREET & CO., LTD., 8, SERLE STREET, LONDON, W.C.

The back outside cover is not available for advertisements.

## Notices.

### EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, etc. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

**All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notifies at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.**

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S. W.

Communications have been received from Captain C. J. Coppinger, Colonel R. H. Firth, Captain R. H. Cordner, Captain R. R. Lewis, Major W. S. Harrison, Major J. V. Forrest, Major P. Evans, Captain E. L. Moss.

The following publications have been received :—

*British : The Hospital, Journal of the United Service Institution of India, The Practitioner, Bedrock, The Lancet, The Royal Engineers' Journal, The Australasian Medical Gazette, Red Cross and Ambulance News, Proceedings of the Royal Society of Medicine, The Journal of State Medicine, St. Bartholomew's Hospital Journal, Medical Press and Circular, The Medical Review, The South African Institute for Medical Research, The Journal of Tropical Medicine and Hygiene, Public Health, The Medical Journal of South Africa, Guy's Hospital Gazette, The Indian Medical Journal, Tropical Diseases Bulletin, The Middlesex Hospital Journal, Journal of the Royal United Service Institution, Journal of the Supply and Transport Corps Indian Army, Memoirs of the Department of Agriculture in India, The Army Service Corps Journal.*

*Foreign : Revista de Sanidad Militar, Archives de Médecine et de Pharmacie Navales, Archiv für Schiffs- und Tropen-Hygiene, Le Caducée, United States Naval Medical Bulletin, Russian Military Medical Journal, Deutsche Militärärztliche Zeitschrift, Bulletin de l'Institut Pasteur, United States Public Health Service, American Medicine, United States Public Health Service Annual Report, 1913, Bulletin of the Johns Hopkins Hospital, Archives de Médecine et de Pharmacie Militaires, Office International d'Hygiène Publique, Annali di Medicina Navale e Coloniale, The Military Surgeon, Russian Naval Medical Journal, Congresso de Granada.*

## MANAGER'S NOTICES.

The **JOURNAL OF THE ROYAL ARMY MEDICAL CORPS** is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

**Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at the War Office. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in April and October of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at the War Office, no entry of such qualifications can be recorded in the Distribution List.**

**Letters notifying change of address should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and must reach there not later than the 20th of each month for the alteration to be made for the following month's issue.**

**It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.**

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,

"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"

WAR OFFICE, WHITEHALL, S.W.



**Distribution List of**  
**SURGEON-GENERALS AND COLONELS**  
**REMOVED FROM THE CORPS AND STILL**  
**ON THE ACTIVE LIST,**  
**OFFICERS OF THE ROYAL ARMY MEDICAL**  
**CORPS,**  
**RE-EMPLOYED RETIRED OFFICERS,**  
**AND**  
**MEDICAL OFFICERS OF THE HOUSEHOLD**  
**CAVALRY.**

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1st APRIL, 1914.

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*[This List is prepared according to the latest information contained in Official Returns. Officers are requested to register any Diplomas or special qualifications at Headquarters, War Office, in order that the list may be published as complete as possible.]*



## ARMY MEDICAL SERVICE.

### WAR OFFICE.

Rank.	Name.	Appointment.
Surgeon-General ..	Gubbins, Sir W. L., K.C.B., M.V.O., M.B., K.H.S.	Director-General, Army Med. Service.
Colonel (temporary Surgeon-General)	Macpherson, W. G., C.M.G., M.B., K.H.P.	Deputy Director-General, Army Medical Service.
Colonel .. ..	O'Keeffe, M. W., M.D. .. ..	Inspector of Medical Services.
Lieutenant-Colonel .	Burtchaell, C. H., M.B. .. ..	Assistant Director-General, Army Medical Service.
„ .. ..	Scott, B. H. .. ..	Deputy Assistant Director-General, Army Medical Service.
„ .. ..	Stanistreet, G. B., M.B. .. ..	Deputy Assistant Director-General, Army Medical Service.
Major .. ..	Blackwell, W. R. .. ..	Deputy Assistant Director-General, Army Medical Service.
„ .. ..	Forrest, J. V., M.B. .. ..	Deputy Assistant Director-General, Army Medical Service (attached to the Department of the Director of Military Operations).

### ARMY MEDICAL ADVISORY BOARD.

Rank.	Name.	Appointment.
Lieutenant-Colonel (Brevet Colonel)	Horrocks, W. H., M.B. .. ..	Expert in Sanitation.
Lieutenant-Colonel (Brevet Colonel)	Leishman, Sir W. B., Knt., F.R.S., M.B., K.H.P.	Expert in Tropical Diseases.

### ROYAL ARMY MEDICAL COLLEGE.

Rank.	Name.	Appointment.
Colonel .. ..	Skinner, B. M., M.V.O. .. ..	Commandant and Director of Studies.
Lieutenant-Colonel	Pilcher, E. M., D.S.O., M.B., F.R.C.S.	Professor of Military Surgery.
„ .. ..	Robinson, O. L. .. ..	„ Tropical Medicine.
„ .. ..	Beveridge, W. W. O., D.S.O., M.B.	„ Hygiene.
Major .. ..	Lelcan, P. S., F.R.C.S. .. ..	Assistant Professor of Hygiene.
„ .. ..	Cummins, S. L., M.D. .. ..	Professor of Pathology.
Captain .. ..	Gray, A. C. H., M.B. .. ..	Assistant Professor of Pathology.
Lieutenant-Colonel	Gibbard, T. W., M.B. .. ..	Lecturer in Syphilology.

## SURGEON-GENERALS.

Name.	Station.	Appointment.
Anderson, L. E., C.B. ..	Dublin .. ..	Deputy Director of Medical Services, Irish Command.
Babbie, W., V.C., C.B., C.M.G., M.B.	Delhi .. ..	Director, Medical Services, Army Headquarters, India.
Bedford, W. G. A., C.M.G., M.B.	Pretoria .. ..	Deputy Director, Medical Services, S. Africa.
Bruce, Sir D., Knt., C.B., F.R.S., M.B., F.R.C.P.	Nyasaland .. ..	(Seconded under Colonial Office.)
Corker, T. M., M.D., K.H.P.	Ootacamund .. ..	Deputy Director of Medical Services, 9th (Secunderabad) Division.
Hathaway, H. G., C.B. ..	Lucknow .. ..	Deputy Director of Medical Services, 8th (Lucknow) Division.
Kenny, W. W., M.B., F.R.C.S.I., K.H.S.	York .. ..	Deputy Director of Medical Services, Northern Command.
MacNeece, J. G., C.B. ..	Salisbury .. ..	Deputy Director, Medical Services, Southern Command.
Sloggett, Sir A. T., Knt., C.B., C.M.G., K.H.S.	.. ..	(Returning to England.)
Whitehead, H. R., C.B., F.R.C.S.	London .. ..	Deputy Director of Medical Services, Eastern Command.

## COLONELS.

Barratt, H. J. .. ..	Bareilly .. ..	A.D.M.S., Bareilly, Garhwal, and Dehra Dun Brigades.
Birrell, W. G., M.B. .. ..	Dover .. ..	A.D.M.S., Eastern Command.
Birt, C. .. ..	Poona .. ..	.. ..
Culling, J. C. .. ..	Chester .. ..	D.D.M.S., Western Command.
Faunce, C. E. .. ..	Woolwich .. ..	A.D.M.S., Eastern Command and Officer in charge Royal Herbert Hospital.
Firth, R. H., F.R.C.S. .. ..	Peshawar .. ..	A.D.M.S., 1st (Peshawar) Division.
Ford, R. W., D.S.O. .. ..	Aldershot .. ..	D.D.M.S. Aldershot Command.
Geddes, R. J., D.S.O., M.B.	Devonport .. ..	A.D.M.S., Southern Command.
Henderson, R. S. F., M.B., K.H.P.	Quetta .. ..	A.D.M.S., 4th (Quetta) Division.
Hunter, G. D., D.S.O. .. ..	Allahabad .. ..	A.D.M.S., Allahabad and Fyzabad Brigades.
Irwin, J. M., M.B. .. ..	Hong Kong .. ..	D.D.M.S., South China.
Jencken, F. J., M.B. .. ..	Colchester .. ..	A.D.M.S., Eastern Command.
Kirkpatrick, R., C.M.G., M.D.	Calcutta .. ..	A.D.M.S., Presidency Brigade.
Lynden-Bell, E. H. L., M.B.	London .. ..	D.D.M.S., London District.
McGill, H. S. .. ..	.. ..	(Temporary Half-pay.)
Macpherson, W. G., C.M.G., M.B., K.H.P. (temporary Surgeon-General)	War Office .. ..	Deputy Director - General, Army Medical Service.
Maher, J. .. ..	Gibraltar .. ..	D.D.M.S., Gibraltar.
Manders, N. .. ..	Cairo .. ..	D.D.M.S., Egypt.
Nichol, C. E., D.S.O., M.B.	Jubbulpore .. ..	A.D.M.S., Jhansi and Jubbulpore Bgds.
O'Donnell, T. J., D.S.O. .. ..	Tidworth .. ..	A.D.M.S., Southern Command
O'Keeffe, M. W., M.D. .. ..	War Office .. ..	Inspector of Medical Services.
Pike, W. W., D.S.O., F.R.C.S.I.	Sialkot .. ..	A.D.M.S., Abbottabad and Sialkot Brigade.
Porter, R., M.B. .. ..	.. ..	(Half-pay.)
Russell, M. W. .. ..	Malta .. ..	D.D.M.S., Malta.
Sawyer, R. H. S., M.B., F.R.C.S.I.	Dublin .. ..	A.D.M.S., Irish Command.
Skinner, B. M., M.V.O. .. ..	R.A.M. College .. ..	Commandant and Director of Studies.
Sloggett, H. M. .. ..	Belfast .. ..	A.D.M.S., Irish Command.
Tate, A. E. .. ..	Bangalore .. ..	A.D.M.S., Bangalore and Southern Brigades.
Thompson, H. N., D.S.O., M.B.	Edinburgh .. ..	D.D.M.S., Scottish Command.
Treherne, F. H., F.R.C.S. Edin.	Meerut .. ..	A.D.M.S., 7th (Meerut) Division.
Trevor, H. O. .. ..	Cork .. ..	A.D.M.S., Irish Command.
Westcott, S., C.M.G. .. ..	Portsmouth .. ..	A.D.M.S., Southern Command.
Woodhouse, T. P. .. ..	.. ..	(Half-pay.)

## ROYAL ARMY MEDICAL CORPS.

## LIEUTENANT-COLONELS.

Name.	Station.	Appointment.	Special Qualifications.
Adams, G. G. .. ..	Secunderabad .. ..	Officer in charge Military Hospital	—
Adamson, H. M., M.B. .. ..	Belgaum .. ..	Officer in charge Military Hospital	2.
Allen, S. G. .. ..	Gibraltar .. ..	Officer in charge Military Hospital and O.C. No. 28 Coy. R.A.M.C.	—
Austin, J. H. E. .. ..	Edinburgh .. ..	Medical Inspector of Recruits, Scottish Command.	—
Barefoot, G. H. .. ..	London .. ..	Officer in charge Queen Alexandra Military Hospital and O.C. No. 35 Coy. R.A.M.C.	—
Bate, A. L. F. .. ..	Woolwich .. ..	Recruiting duties .. ..	—
Beach, T. B. .. ..	Alexandria .. ..	Officer in charge Military Hospital	—
Begbie, F. W. .. ..	Maymyo .. ..	.. ..	—
Berryman, W. E. .. ..	Woking .. ..	Officer in charge Military Hospital	—
Beveridge, W. W. O., D.S.O. M.B.	R.A.M. College .. ..	Professor of Hygiene .. ..	2.
Bewley, A. W. .. ..	York .. ..	D.A.D.M.S. Northern Command	—
Beyts, W. G. .. ..	Roorkee .. ..	Officer in charge Military Hospital	—
Blackwell, C. T., M.D. .. ..	Hyderabad .. ..	.. ..	2.
Blenkinsop, A. P. .. ..	Delhi .. ..	Assistant Director, "Medical Services (British Service), Army Headquarters, India	—
Bray, G. A. T. .. ..	London .. ..	Deputy Surg., Roy. Hosp., Chelsea	—
Brogden, J. E. .. ..	Malta .. ..	Off. in ch. Mil. Hosp., Imtarfa ..	—
Brown, H. H., M.B. .. ..	Newcastle .. ..	Officer in charge Military Hospital and S.M.O. North Eastern Coast Defences	—
Browne, E. G. .. ..	Peshawar .. ..	Officer in charge Military Hospital	2.
Buist, H. J. M., D.S.O., M.B.	Pretoria .. ..	Off. in ch. Mil. Hosp., Roberts' Heights, and O.C. No. 23 Coy. R.A.M.C.	—
Bullen, J. W., M.D. .. ..	Strensall .. ..	Officer in charge Military Hospital	2.
Burnside, E. A. .. ..	Bangalore .. ..	.. ..	—
Burtchaell, C. H., M.B. .. ..	War Office .. ..	Assistant Director-General, "Army Medical Service	2.
Burton, F. H. M., M.D. .. ..	Warley .. ..	Officer in charge Military Hospital	—
Caldwell, R., F.R.C.S. .. ..	Portsmouth .. ..	Recruiting duties .. ..	2.
Carr, H., M.D. .. ..	Ambala .. ..	Officer in charge Military Hospital	—
Clark, S. F., M.B. .. ..	Chester .. ..	Medical Inspector of Recruits, Western Command	2.
Connor, J. C., M.B. .. ..	Dublin .. ..	.. ..	—
Copeland, R. J., M.B. .. ..	York .. ..	Medical Inspector of Recruits, Northern Command	—
Cree, G. .. ..	Bordon .. ..	A.D.M.S., Aldershot Command ..	—
Cree, H. E. .. ..	Sialkot .. ..	Officer in charge Military Hospital	—
Dalton, C. .. ..	Dublin .. ..	D.A.D.M.S. Irish Command ..	—
Daly, J. H. .. ..	Belfast .. ..	Officer in charge Military Hosp., O.C. No. 15 Coy. R.A.M.C., and S.M.O. N. Irish Coast Defences	—
Daly, T. .. ..	Chester .. ..	Officer in charge Military Hosp., O.C. No. 19 Coy. R.A.M.C. and S.M.O. North Western Coast Defences	—

*Special Qualifications.*

- |                              |                               |                                  |                      |
|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otolaryngology.  |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Davidson, J. S., M.B.	Agra	Officer in charge Military Hospital	—
Donaldson, J.	Jubbulpore	" " " "	—
Donegan, J. F.	Secunderabad	" " " "	—
Dunn, H. N., M.B.	Netley	Officer in charge Surgical Division	—
Eckersley, E., M.B.	Quetta	Officer in charge Military Hospital	2.
Elkington, H. P. G.	Shorncliffe	Officer in charge Military Hosp., O.C. No. 11 Coy. R.A.M.C.	2.
Elliott, C. R., M.D.	Jhansi	Officer in charge Military Hospital	2.
Faichnie, N., M.B.	Preston	" " " "	2. 9.
Fallon, J.	Chakrata	" " " "	—
Ferguson, J. D., D.S.O.	Straits Settlements	Senior Medical Officer, O.C. No. 30 Coy., R.A.M.C.	—
Ferguson, N. C., C.M.G., M.B.	York	Officer in charge Military Hosp., O.C. No. 8 Coy. R.A.M.C.	2.
Fletcher, H. J., M.B.	Rawal Pindi	Officer in charge Military Hospital	—
Forde, B., M.B.	Bulford	" " " "	2.
Gerrard, J. J., M.B.	West Africa	Senior Medical Officer	—
Gibbard, T. W., M.B.	London	Offi. in ch. Mil. Hosp., Rochester Row, Lecturer in Syphilology R.A.M. College, and O.C. No. 18 Coy. R.A.M.C.	7.
Girvin, J.	Curragh	Officer in charge Military Hospital and O.C. No. 17 Coy. R.A.M.C.	—
Gordon, P. C. H.	Jersey	S.M.O. and Officer in charge Military Hospital, Fort Regent	—
Gordon-Hall, F.W.G., M.B.	Hong Kong	Officer in charge Military Hospital Victoria and O.C. No. 27 Coy. R.A.M.C.	—
Gray, W. L., M.B.	Jullundur	Officer in charge Military Hospital	2.
Green, J. S., M.B.	Fermoy	" " " "	—
Haines, H. A., M.D.	Chatham	Officer in charge Military Hospital and O.C. No. 10 Coy. R.A.M.C., S.M.O., Eastern Coast Defences	—
Hale, C. H., D.S.O.	Maymyo	Officer in charge Military Hospital (On leave)	—
Hall, R. H., M.D.	"	" " " "	—
Hallaran, W., M.B.	Bareilly	Officer in charge Military Hospital	—
Hardy, F. W., M.B.	Allahabad	" " " "	2.
Hardy, W. E.	Cawnpore	" " " "	—
Hassard, E. M.	Karachi	" " " "	—
Healey, C. W. R.	Woolwich	Offi. in ch. Med. Div. R.H. Hosp.	—
Hearn, M. L.	Ceylon	Senior Medical Officer, in ch. Mil. Hospital, Colombo, O.C. No. 26 Coy. R.A.M.C., and in ch. A.M. Stores	—
Hickson, S., M.B., K.H.S. (Brevet Colonel)	London	" " " "	—
Holt, M. P. C., D.S.O.	Aldershot	Offi. in ch. Cambridge Hosp., O.C. Nos. 1 and 3 Coys. R.A.M.C.	5.
Holyoake, R.	India	" " " "	—
Horrocks, W. H., M.B. (Brevet Colonel)	London	Expert in Sanitation, Army Medi- cal Advisory Board	2.
Inniss, B. J.	Delhi	Officer in charge Military Hospital	—
Jameson, J. C., M.B.	Woolwich	Offi. in ch. Surg. Div. R.H. Hosp.	2.
Jones, F. W. C., M.B.	Meerut	Officer in charge Military Hospital	—
Julian, O. R. A., C.M.G.	Chelsea	Physician and Surg. Roy. Hosp.	2.
Kennedy, A.	Netley	Officer in charge "D" Block	—
Knaggs, H. T., M.B.	Cairo	Offi. in charge Mil. Hosp. Citadel, O.C. No. 33 Coy. R.A.M.C.	2.

*Special Qualifications.*

- |                              |                               |                                  |                      |
|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station	Appointment.	Special Qualifications.
Lane, C. A., M.B.	Madras	Officer in charge Military Hospital and Indian Infantry Detachment Hospital, Perambur	—
Lavie, T. G.	Malta	Off. in ch. Mil. Hosp., Cottonera, O.C. No. 30 Coy. R.A.M.C.	—
Leishman, Sir W. B., Knt., F.R.S., M.B., K.H.P. (Brevet Colonel)	London	Expert in Tropical Diseases, Army Medical Advisory Board	—
Le Quesne, F. S., V.C.	Gravesend	Officer in charge Military Hospital	—
Lilly, A. T. I.	Colaba	" " " "	—
Luther, A. J.	Potchefstroom	" " " "	—
McCulloch, T., M.B.	Netley	Officer in charge Medical Division and Sanatorium	—
MacDonald, C. J., M.D.	Tientsin	S.M.O. and O.C. R.A.M.C. North China	—
Macdonald, S., M.B.	Salisbury	Medical Inspector of Recruits, Southern Command	—
Macleod, R. L. R., M.B.	Devonport	Off. in ch. Mil. Hosp., O.C. No. 7 Coy. R.A.M.C. and S.M.O. South Western Coast Defences	2.
McLoughlin, G. S., D.S.O., M.B.	Winchester	Officer in charge Military Hospital	—
Marks, G. F. H., M.D.	Dalhousie	" " " "	—
Mawhinny, R. J. W.	Nasirabad	" " " "	2.
Meek, J., M.D.	Cosham	Off. in ch. "Alexandra" Hosp., O.C. No. 6 Coy. R.A.M.C., and S.M.O. Southern Coast Defences	2.
Melville, C. H., M.B. (Brevet Colonel)	Tidworth	Officer in charge Military Hospital and O.C. No. 20 Coy. R.A.M.C.	2.
Moore, S. G.	Aldershot	" " " "	2.
Morgan, F. J.	Woolwich	S.M.O. Royal Arsenal	—
Morgan, J. C.	Glasgow	Officer in charge Military Hospital	2.
Morris, A. E., M.D.	Cork	Officer in charge Military Hospital, O.C. No. 16 Coy. R.A.M.C., and S.M.O. South Irish Coast Defences	—
Mould, W. T.	Fyzabad	Officer in charge Military Hospital	—
Nash, L. T. M.	Hounslow	" " " "	—
Newland, F. R., M.B.	Colchester	Off. in ch. Military Hospital and O.C. No. 9 Coy. R.A.M.C.	—
O'Callaghan, D. M.	Dover	Off. in ch. Mil. Hosp. and S.M.O. South Eastern Coast Defences	—
O'Halloran, M., M.D.	Edinburgh	Officer in charge Military Hospital, O.C. No. 13 Coy. R.A.M.C., and S.M.O. Scottish Coast Defences	—
Penton, R. H., D.S.O.	Ranikhet	Officer in charge Military Hospital	2.
Philson, S. C.	Lucknow	" " " "	—
Pilcher, E. M., D.S.O., M.B., F.R.C.S.	R.A.M. College	Professor of Military Surgery	5.
Pocock, H. I.	Campbellpore	Officer in charge Military Hospital	16.
Rawnsley, G. T.	Manchester	D.A.D.M.S. East Lanc. Div. T.F.	—
Reilly, C. C.	Calcutta	Officer in charge Military Hospital	—
Robinson, O. L.	R.A.M. College	Prof. of Tropical Medicine	2.
Rowan, H. D., M.B.	Dublin	Officer in charge King George V. Hospital and O.C. No. 14 Coy. R.A.M.C.	—
Russell, J. J., M.B.	Salisbury	D.A.D.M.S., Southern Command	—
Scott, B. H.	War Office	Deputy Assistant Director-General Army Medical Service	2.

*Special Qualifications.*

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |



Name.	Station.	Appointment.	Special Qualifications.
Sexton, M. J., M.D. ..	Wynberg .. ..	Officer in charge Military Hospital, and O.C. No. 22 Coy. R.A.M.C.	—
Shanahan, D. D... ..	London .. ..	D.A.D.M.S. Eastern Command	—
Shine, J. M. F., M.D. ..	Nowshera .. ..	Officer in charge Military Hospital	—
Smith, F., D.S.O. (Brevet Colonel)	Calcutta .. ..	Officer in charge Dep. Followers' Hospital, Garrison Dispensary, and Staff Surgeon	2.
Stanistreet, G. B., M.B.	War Office .. ..	Deputy Asst. Director-General, Army Medical Service	—
Starr, W. H. .. ..	Lichfield .. ..	Officer in charge Military Hospital	—
Stone, C. A., M.D. ..	Parkhurst .. ..	—	—
Sutton, A. A., D.S.O. ..	Aldershot .. ..	Commandant R.A.M.C. Training Establishment, and O.C. Depot R.A.M.C.	—
Swan, W. T., M.B. ..	Netley .. ..	Off. in charge Royal Victoria Hosp.	—
Tate, G. W., M.B. ..	Bermuda .. ..	S.M.O., O.C. No. 25 Coy. R.A.M.C., and Off. in ch. Mil. Hosp., Prospect	2.9.
Thomson, J., M.B. ..	Aldershot .. ..	Off. in charge Records R.A.M.C.	—
Thurston, H. C., C.M.G.	.. ..	Off. in ch. Connaught Hospital and O.C. No. 2 Coy. R.A.M.C.	—
Way, L. .. ..	Ferozepore .. ..	Officer in charge Military Hospital	—
Whaite, T. Du B., M.B. ..	Lahore Cantonment ..	" " " "	—
Whitstone, C. W. H., M.B.	Hilsea .. ..	" " " "	—
Wilson, J. B., M.D. ..	Jamaica .. ..	S.M.O., O.C. No. 29 Coy. R.A.M.C., and in charge Military Hospital, Up Park Camp	—
Windle, R. J., M.B. ..	Poona .. ..	Officer in charge Military Hospital	—
Winter, H. E. .. ..	Colaba .. ..	" " " "	—
Winter, T. B. .. ..	Canterbury .. ..	Officer in charge Military Hospital	2.
Withers, S. H., M.B. ..	Dagshai .. ..	Off. in ch. Mil. and Cant. Hosp.	—
Wright, R. W. .. ..	Mhow .. ..	Officer in charge Military Hospital	—
Yarr, M. T., F.R.C.S.I. ..	London .. ..	S.M.O. London Recruiting area, and Medical Inspector of Recruits, London District	7.
Young, C. A. .. ..	Chatham .. ..	" " " "	—

## MAJORS.

Addams-Williams, L. ..	Quetta .. ..	—
Adderley, A. C. .. ..	Wynberg .. ..	Coy. Off. No. 22 Coy. R.A.M.C.
Adye-Curran, S. M. ..	Sialkot .. ..	—
Adye-Curran, W. J. P. ..	Cosham .. ..	Specialist in Operative Surgery ..
Ainsworth, R. B. ..	Tidworth .. ..	Sanitary Officer Salisbury Plain
Alexander, J. D., M.B. ..	Jubbulpore .. ..	—
Anderson, H. S. .. ..	Buttevant .. ..	Officer in charge Military Hospital
Anderson, J. B. .. ..	Southampton .. ..	Embarkation Medical Officer ..
Archer, G. J. S., M.B. ..	Netley .. ..	Specialist in Operative Surgery ..
Archer, S. A. .. ..	Dundalk .. ..	Officer in charge Military Hospital
Argles, R. L. .. ..	Ferozepore .. ..	—
Ashe, F. .. ..	Secunderabad .. ..	Spec. in Midwifery and Diseases of Women and Children
Aylen, E. V. .. ..	Rawal Pindi .. ..	Specialist in Dermatology ..
Babington, M. H. ..	London .. ..	Clin. Pathologist Q.A. Mil. Hosp.
Baillie, G., M.B. ..	Colchester .. ..	—

## Special Qualifications.

1. State Medicine.	5. Operative Surgery.	9. Diploma in Tropical Medicine.	13. Otology.
2. Diploma in Public Health.	6. Physical Training.	10. Skiagraphy.	14. Laryngology.
3. Bacteriology.	7. Ophthalmology.	11. Psychological Medicine.	15. Specific Fevers.
4. Dermatology.	8. Midwifery and Gynecology.	12. Pediatrics.	16. Dental Surgery.

Name.	Station.	Appointment.	Special Qualifications.
Baker, W. L. .. ..	London .. ..	Recruiting duties .. ..	7.
Balck, C. A. J. A., M.B. .. ..	Dublin .. ..	Specialist in Physical Training .. ..	2.6.
Barbour, J. H., M.B. .. ..	London .. ..	Recruiting duties .. ..	—
Barnett, K. B., M.B., F.R.C.S.I.	Lydd .. ..	.. ..	12.
Barrow, H. P. W. .. ..	London .. ..	.. ..	2.3.9.
Bartlett, B. S. .. ..	Lahore Cant. .. ..	.. ..	—
Bateman, H. R. .. ..	Shorncliffe .. ..	Coy. Officer, No. 11 Coy. R.A.M.C., and in ch. Laboratory	3.
Beatty, M. C., M.B. .. ..	Devonport .. ..	.. ..	2.
Bennett, E. .. ..	Deolali .. ..	.. ..	—
Bennett, W., M.B. .. ..	Maymyo .. ..	D.A.D.M.S. (Sanitary) Burma Division	1
Bennett, W. L., M.B., F.R.C.S. Edin.	Halifax .. ..	Officer in charge Military Hospital	—
Biggam, T., M.B. .. ..	Bordon .. ..	Officer in charge Recep. Station .. ..	—
Birrell, E. T. F., M.B. .. ..	London .. ..	Coy. Offi. No. 35 Coy. R.A.M.C.	7.
Black, R. B., M.B. .. ..	Egypt .. ..	Egyptian Army .. ..	—
Blackham, R. J., C.I.E. .. ..	Jutogh .. ..	Officer in charge Military Hospital	2.8.
Blackwell, W. R. .. ..	War Office .. ..	Deputy Asst. Director-General, Army Medical Service	—
Bliss, E. W. .. ..	Chatham .. ..	.. ..	5.
Bond, J. H. R. .. ..	Naini Tal .. ..	Officer in charge Military Hospital	—
Bostock, J. S., M.B. .. ..	Aldershot .. ..	Coy. Offi. Nos. 1 and 3 Coy. R.A.M.C.	—
Bourke, E. A. .. ..	Cardiff .. ..	Officer in charge Military Hospital	2.15.
Bowen, A. W. N. .. ..	Belfast .. ..	.. ..	—
Boyle, M., M.B. .. ..	Jersey .. ..	.. ..	10.
Brakenridge, F. J. .. ..	Oxford .. ..	Officer in charge Military Hospital	1.2.
Bransbury, H. A. .. ..	Belgaum .. ..	Officer in charge Cant. Hospital	4.
Bray, H. A. (Local Lt.-Col.)	Egypt .. ..	P.M.O., Egyptian Army .. ..	—
Brodribb, E. .. ..	Malta .. ..	Offi. in Med. ch. Troops, Scutari	7.
Brown, R. T., M.D. .. ..	Darjeeling .. ..	Officer in charge Military Hospital	2.3
Browne-Mason, H. O. B. .. ..	Poona .. ..	D.A.D.M.S. (Mohn.), 6th (Poona) Division	4.
Brunskill, J. H., M.B. .. ..	Dublin .. ..	Sanitary Officer .. ..	3.
Buist, John M., M.B. .. ..	Netley .. ..	.. ..	2.3.9.
Burke, B. B. .. ..	Dover .. ..	.. ..	13.14.
Buswell, F. R. .. ..	Jubbulpore .. ..	.. ..	—
Butler, S. G. .. ..	Curragh .. ..	Specialist in Operative Surgery .. ..	5.
Campbell, J. H., D.S.O. .. ..	London .. ..	Medical Inspector of Recruits, Eastern Command	8.
Carlyon, A. F. .. ..	Mauritius .. ..	.. ..	—
Carr, C. H., M.D. .. ..	Tidworth .. ..	Specialist in Dental Surgery and Coy. Offi. No. 20 Coy. R.A.M.C.	16.
Carroll, F. F., M.B. .. ..	Egypt .. ..	Egyptian Army .. ..	5.
Chopping, A. .. ..	Netley .. ..	Registrar R.V. Hospital, and O.C. Nos. 4, 5 and 21 Coys. R.A.M.C.	—
Churton, J. G. .. ..	Bangalore .. ..	Specialist in Operative Surgery 9th (Secunderabad) Division	5.
Clark, E. S., M.B. .. ..	Jhansi .. ..	.. ..	15.
Clarke, J. B., M.B. .. ..	Colchester .. ..	Specialist in Operative Surgery .. ..	5.
Clarke, T. H. M., C.M.G., D.S.O., M.B.	Dublin .. ..	Physician and Surgeon Royal Hos- pital, Kilmainham, and Medical Officer Royal Hibernian School	—
Clements, R. W., M.B. .. ..	Cork .. ..	.. ..	2.9.10.
Cochrane, E. W. W., M.B. .. ..	Aldershot .. ..	.. ..	2.3.
Collingwood, P. H. .. ..	Devonport .. ..	.. ..	—
Collins, D. J., M.D. .. ..	Kirkee .. ..	Officer in charge Military Hospital	2.7.

*Special Qualifications.*

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otolaryngology.  |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynecology. | 12. Pediatrics.                  | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Condon, E. H., M.B.	Bareilly .. ..	.. ..	—
Connolly, E. P.	Rawal Pindi .. ..	D.A.D.M.S. (Mobn.), 2nd (Rawal Pindi) Division	—
Corkery, M. P.	Fermoy .. ..	.. ..	1.
Cotterill, L., M.B.	Nowshera .. ..	.. ..	1.
Cotton, F. W.	Nasirabad .. ..	.. ..	—
Cowan, J., M.B.	Pachmarhi .. ..	Offi. in ch. Mil. and Cant. Hosps.	3.
Cowey, R. V.	Bulford .. ..	Offi. in ch. Mil. Families' Hosp., Spec. in Midwifery and Gynæcology	8.
Craig, B. A.	Newcastle .. ..	Adjutant School of Instruction, R.A.M.C., T.F.	—
Crawford, G. S., M.D.	Dublin .. ..	Recruiting duties .. ..	2.9.
Crawford, V. J.	Southern Command .. ..	.. ..	8.
Crisp, G. B.	Hong Kong .. ..	Offi. in ch. Mil. Hosp., Kowloon	—
Croly, W. C.	Mount Abu .. ..	Offi. in ch. Mil. Hosp., and in Med. ch. Lawrence School and Residency Surgeon	—
Crosthwait, W. S.	Ambala .. ..	.. ..	—
Cumming, C. C., M.B.	Malta .. ..	Clinical Pathologist .. ..	2.3.
Cummins, S. L., M.D.	R.A.M. College .. ..	Professor of Pathology .. ..	3.9.
Cunningham, R. A., M.B.	Meerut .. ..	D.A.D.M.S. (Sanitary) 7th (Meerut) Division	2.
Curme, D. E.	Pontefract .. ..	Officer in charge Military Hospital	—
Cuthbert, J. M., M.B.	Edinburgh .. ..	Clinical Pathologist .. ..	3.
Dansey - Browning, G., M.R.C.P.Lond.	Gibraltar .. ..	Sanitary Officer .. ..	2.9.
Davidson, H. A., M.B.	Straits Settlements .. ..	Officer in charge Military Hosp., Blakan Mati	2.
Davis, W.	Meerut .. ..	.. ..	—
Delap, G. G., D.S.O.	Pretoria .. ..	D.A.D.M.S., South Africa .. ..	—
Dennis, B. R., M.B.	London .. ..	Recruiting duties .. ..	3.
Dorgan, J., M.B.	Hong Kong .. ..	Sanitary Officer .. ..	1.2.9.
Douglas, H. E. M., V.C., D.S.O.	Cairo .. ..	Offi. in Med. ch. Troops, Abbassia	2.
Douglass, P. C.	Nowgong .. ..	Offi. in ch. Military Hospital and Spec. in Prevention of Disease	—
Duffey, A. C., M.D.	Rawal Pindi .. ..	Staff Surgeon .. ..	8.
Easton, P. G.	Aldershot .. ..	In Medical charge Families, Stanhope Lines, Spec. in Midwifery	9.
Ellery, E. E.	Cairo .. ..	Specialist in Operative Surgery .. ..	5.
Ellery, R. F.	Bareilly .. ..	.. ..	—
Ellis, W. F.	Aldershot .. ..	.. ..	5.
Elsner, O. W. A.	Pietermaritzburg .. ..	Offi. in ch. Mil. Hosp. and Embarkation Med. Offi., Durban	2.
Ensor, H., D.S.O., M.B.	Woolwich .. ..	Registrar Royal Herbert Hosp. and O.C. Nos. 12 and 34 Coys. R.A.M.C.	3.
Evans, C. R.	Malta .. ..	Coy. Offi. No. 30 Coy. R.A.M.C.	—
Evans, P., M.B.	Devonport .. ..	Specialist in Operative Surgery .. ..	2.5.15.
Fairrie, S. H., M.B.	Shoeburyness .. ..	Offi. in ch. Mil. and Fam. Hosp.	8.
Falkner, M. W., F.R.C.S.I.	Bermuda .. ..	Coy. Offi. No. 25 Coy. R.A.M.C., Specialist in Operative Surgery	5.
Falkner, P. H., F.R.C.S.I.	London .. ..	Recruiting duties .. ..	—
Fawcett, R. F. M.	Dublin .. ..	.. ..	—
Fawcus, H. B., M.B.	Aldershot .. ..	Instr. School of Army Sanitation	1.2.
Fell, M. H. G.	„ .. ..	D.A.D.M.S. Aldershot Command, Inst. Med. Services Staff Coll.	2.9.

*Special Qualifications.*

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otolology.       |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynæcology. | 12. Pediatrics.                  | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Ffrench, E. G., M.D., F.R.C.S. Edin.	Poonamallee	.. .. .	—
Fielding, T. E., M.B.	Devonport	Recruiting duties and in charge Detention Barracks	3.
Fitzgerald, FitzG. G.	Dover	Offi. in Med. ch. Duke of York's Royal Military School	—
Fleming, C. E., M.B.	Pretoria	Offi. in ch. Mil. Families' Hosp., Roberts' Heights, Specialist in Ophthalmology	7.
Forrest, J. V., M.B.	War Office	Deputy Assistant Director-Gen. Army Medical Service	—
Foster, J. G., M.B.	Ahmednagar	.. .. .	—
Foulds, M. F.	Belfast	Specialist in Operative Surgery	5.
Fox, A. C...	Dublin	.. .. .	8.
Fry, W. B.	Woolwich	Clinical Pathologist	3.
Fuhr, R. S. H., D.S.O.	"	Medical Officer Royal Arsenal	8.
Furnivall, C. H.	Karachi	Officer in Medical charge Civil Jail	—
Gallie, J. S.	Caterham	Officer in charge Military Hospital	—
Gibson, A. W.	Lahore	.. .. .	5.
Gill, J. G.	Southern Command	.. .. .	—
Goddard, G. H.	Brighton	Officer in charge Military Hospital	8.
Goldsmith, G. M., M.B.	Lebong	.. .. .	—
Goodwin, T. H. J. C., D.S.O.	Devonport	Coy. Officer No. 7 Coy. R.A.M.C.	5.10.
Goodwin, W. R. P.	Fyzabad	.. .. .	7.
Graham, W. A. S. J.	Neemuch	Offi. in ch. Military and Followers' Hosps. and in Med. ch. Political Agency	—
Grattan, H. W.	Naini Tal	Officer in Medical charge Enteric Fever Convalescent Depôt	2.3.
Grech, J.	Warrington	Officer in charge Military Hospital	10.
Green, S. F. St. D., M.D.	Quetta	Officer in charge Fam. Hosp., Staff Surg., Spec. in Midwifery and Dis. of Women and Children 4th (Quetta) Division	8.
Greenwood, A. R.	Aldershot	Specialist in Operative Surgery Connaught Hospital	5.
Gunter, F. E., M.B.	Tidworth	.. .. .	5.
Gwynn, W. P.	Dublin	.. .. .	—
Hall, S. O.	Rangoon	.. .. .	8.
Hamerton, A. E., D.S.O.	Eastern Command	.. .. .	3.
Harding, D. L., F.R.C.S.I.	Londonderry	Officer in charge Military Hospital	2.
Harrison, L. W., M.B.	London	Clinical Pathologist Military Hos- pital, Rochester Row	3.
Harrison, W. S., M.B.	Jamaica	Sanitary Officer	3.
Hartigan, J. A., M.B.	Tientsin	Officer in charge Military Hospital	—
Harvey, D., M.D.	R.A.M. College	Clinical Pathologist	1.
Harvey, F...	Colaba	.. .. .	2.3.9.
Harvey, W. J. S.	Jamaica	Coy. Officer No. 29 Coy. R.A.M.C.	—
Haves, E. C.	Cosham	.. .. .	2.7.
Heffernan, F. J. C., F.R.C.S.I.	Mhow	.. .. .	—
Henderson, P. H., M.B.	Portsmouth	Officer in charge Reception Station	1.
Hennesy, J., M.B.	Ahmednagar	" " Military Hospital	—
Herrick, H.	Hollywood	" " " "	—
Hewetson, H.	Mill Hill	" " " "	1.2.
Hime, H. C. R., M.B.	Wellington	Specialist in Ophthalmology 9th (Secunderabad) Division	2.7.

*Special Qualifications.*

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|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Hinge, H. A. .. ..	Aldershot .. ..	Sanitary Offi. Northern Command ..	1.2.
Hodgson, J. E. .. ..	York .. ..	(West African leave) .. ..	—
Hooper, A. W., D.S.O. ..	Shorncliffe .. ..	Specialist in Operative Surgery, 7th (Meerut) Division ..	2.
Houghton, G. J. .. ..	Meerut .. ..	Medical Officer R.A.C. Factory ..	15.
Houghton, J. W. H., M.B.	London .. ..	Officer in charge Military Hospital ..	—
Howell, H. A. L... ..	Dinapore .. ..	.. ..	15.
Howley, H. E. J. A. ..	Portsmouth .. ..	Clinical Assist., Q.A. Mil. Hospital ..	—
Hudleston, W. E. .. ..	London .. ..	Specialist in Operative Surgery ..	5.
Hull, A. J., F.R.C.S. ..	Chatham .. ..	.. ..	—
Humphry, L. .. ..	Cairo .. ..	D.A.D.M.S. W. Riding Div. T.F. ..	2.
Hunt, R. N., M.B. .. ..	York .. ..	Officer in ch. Mty. Hosp. Nuwara-Eliya ..	—
Hyde, D. O., M.B. .. ..	Ceylon .. ..	D.A.D.M.S. Wessex Div. T.F. ..	—
Hyde, P. G., M.B. .. ..	Exeter .. ..	Assistant to Commandant ..	—
Inkson, E. T., V.C. ..	R.A.M. College ..	Compy. Offi. No. 16 Coy. R.A.M.C. ..	—
Irvine, F. S., M.B. ..	Cork .. ..	Specialist in Dermatology 1st (Peshawar) Division ..	4.
Irwin, A. W. A. .. ..	Peshawar .. ..	D.A.D.M.S. (San.) 8th (Lucknow) Division ..	2.
Jameson, A. D. .. ..	Lucknow .. ..	Officer in Med. ch. Cordite Factory ..	—
Johnson, J. T., M.D. ..	Wellington .. ..	Officer in ch. Military Hosp. and S.M.O. Western Coast Defences ..	—
Johnston, T. P., M.B. ..	Pembroke Dock ..	D.A.D.M.S. Highland Div. Territorial Force ..	2.8.
Keble, A. E. C. .. ..	Perth .. ..	.. ..	—
Kelly, J. F. M., M.B. ..	Colchester .. ..	.. ..	3.9.
Kennedy, J. C., M.D. ..	Lucknow .. ..	Specialist in Ophthalmology ..	7.
Kiddle, F., M.B. .. ..	Colchester .. ..	.. ..	—
Killery, St. J. B. .. ..	Bangalore .. ..	Officer in charge Military Hospital ..	2.
Knox, E. B., M.D. .. ..	Norwich .. ..	(Sick leave) .. ..	5.
Lamballe, F. W., M.B. ..	Maymyo .. ..	Recruiting duties .. ..	—
Langstaff, J. W. .. ..	London .. ..	Officer in charge Military Hospital ..	2.
Lauder, F. P. .. ..	Tralee .. ..	.. ..	2.9.
Lauder, T. C., M.B. ..	Kinsale .. ..	" " " " ..	5.10.
Lawson, C. B., M.B. ..	Shorncliffe .. ..	Senior Medical Officer .. ..	—
Lawson, D. .. ..	Mauritius .. ..	.. ..	1.2.
Leake, J. W. .. ..	Dover .. ..	Assistant Professor of Hygiene ..	2.5.
Lelean, P. S., F.R.C.S. ..	R.A.M. College ..	.. ..	—
L'Estrange, E. F. Q. ..	Londonderry .. ..	.. ..	—
Lewis, R. C. .. ..	Gibraltar .. ..	.. ..	—
LLoyd, L. N., D.S.O. ..	Preston .. ..	.. ..	—
Lloyd, R. H. .. ..	Multan .. ..	Officer in charge Military Hospital ..	—
Long, H. W., M.B. .. ..	Choulston .. ..	" " " " ..	—
Longhurst, B. W. .. ..	Ambala .. ..	.. ..	16.
Lowsley, M. M. .. ..	Kasauli .. ..	Officer in charge Military Hospital and Civil Surgeon ..	8.
MacCarthy, I. A. O. ..	Woolwich .. ..	Officer in charge Auxiliary Hosp. ..	—
McCarthy, J. McD., M.B.	Sabathu .. ..	Officer in charge Military Hospital ..	1.2.9.
McDermott, T., M.B. ..	Woolwich .. ..	Specialist in Ophthalmology ..	7.
McDonnell, E., M.B. ..	Shorncliffe .. ..	.. ..	—
MacDougall, A. J., M.B.	Athlone .. ..	Officer in charge Military Hospital ..	3.
MacKenzie, T. C., D.S.O.	Richmond .. ..	D.A.D.M.S. Northumbrian Div., T.F. ..	—
MacKessack, P., M.B. ..	London .. ..	Sanitary Offi. Eastern Command ..	2.3.
MacLaughlin, A. M., M.B.	Bellary .. ..	Officer in charge Military Hospital ..	1.2.

*Special Qualifications.*

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otolaryngology.  |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynecology. | 12. Pediatrics.                  | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
McLennan, F., M.B.	Aberdeen	Adjutant School of Instruction, R.A.M.C., T.F.	—
McMunn, A.	Hong Kong		—
McMunn, J. R.	Netley		15.
McNaught, J. G., M.D.	Aldershot	Off. in charge Isolation Hospital	2.
Macpherson, J. D. G., M.B.	Liverpool	D.A.D.M.S. West Lanc. Div., T.F.	—
Mainprise, C. W.	Rawal Pindi		—
Mangin, F. M.	Poona	Specialist in Ophthalmology 6th (Poona) Division	7.
Marriott, E. W. P. V.	Mullingar	Officer in charge Military Hospital	10.
Martin, C. B., M.B.	Sandhurst	Surgeon Royal Military College	—
Martin, H. G.	Dublin		8.
Martin, J. F., M.B.	Sandhurst	Assistant Surgeon R.M. College	2.
Master, A. E., M.B.	Windsor	Officer in charge Military Hospital	14.
Matthews, J.	Northern Command		7.
Maurice, G. T. K.	Worcester		12.
Milner, A. E.	Birmingham	Recruiting duties	10.
Mitchell, A. H. McN.	Dover		7.
Mitchell, L. A., M.B.	Aldershot		—
Moore, G. A., M.D.	"	Spec. in Otology Cambridge Hosp.	14.
More, L. P., M.B.	Wellington	Officer in charge Military Hospital	—
Morgan, C. K., M.B.	Aldershot	Instructor, Training School	10.
Morphew, E. M.	Bury	Officer in charge Military Hospital	—
Morris, A. H.	Malta	Sanitary Officer	2.3.
Morton, H. M., M.B.	Glasgow	Recruiting duties	—
Murphy, J. P. J., M.B.	Potchefstroom		2.
Myles, C. D., M.B.	Chester	San. Officer Western Command	2.9.
Nicholls, H. M., M.B.	Scottish Command		—
Nickerson, W. H. S., V.C., M.B.	Rawal Pindi	D.A.D.M.S. (Sanitary) 2nd (Rawal Pindi) Division	2.3.
Norman, H. H., M.B.	Woolwich		—
Norrington, H. L. W.	Malta	Off. in charge Mil. Hosp., Valletta	8.
O'Flaherty, A. R.	Kasauli	Officer in charge Cant. Hospital	—
O'Gorman, C. J., D.S.O.	Barrackpore	Officer in charge Mil. Hosp. and in Med. ch. Ordnance Factories	—
O'Grady, S. de C., M.B.	Aldershot	Officer in ch. Reception Station, Deepcut and Blackdown	1.
O'Reilly, H. W. H., M.B.	Secunderabad		—
O'Reilly, P. S.	Woolwich	Medical Officer Royal Arsenal	7.
Ormsby, G. J. A., M.D.	Irish Command		—
Packer, H. D.	Karachi		3.
Palmer, F. J.	Mhow	Specialist in Operative Surgery	5.
Palmer, H. K.	Cosham		—
Parkes, E. E., M.B.	Jubbulpore		7.
Parry, F. M., M.B.	Mauritius	Off. in ch. Detention Hosp., Vacoas	2.
Parsons, A. R. C.	Edinburgh	Specialist in Operative Surgery	5.
Penny, F. S., M.B.	Limerick	Officer in charge Military Hospital	1.2.
Perry, S. J. C. P., F.R.C.S.I.	Lebong		10.
Pinches, H. G.	Chatham	Recruiting duties	—
Poe, J., M.B.	Shorncliffe		—
Pollock, C. E.	West Africa		4.10.
Popham, R. L.	Nowshera		—
Potter, T. J.	Cairo	Clinical Pathologist	2.3.
Powell, E. E.	Ambala		—
Powell, E. W.	Ballincollig	Officer in charge Military Hospital	3.
Powell, J., M.B.	Egypt	Egyptian Army	—

*Special Qualifications.*

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|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Pediatrics.                  | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Power, W. M. .. ..	Chatham .. ..	Officer in charge Mil. Fam. Hosp.	8.
Prescott, J. J. W., D.S.O.	Portland .. ..	" " Military Hospital	7.
Probyn, P. J., D.S.O., M.B.	Leeds .. ..	" " " "	2.
Profeit, C. W., M.B. ..	London .. ..	Spec. in Otology Military Hosp., Rochester Row, Coy. Officer No. 18 Coy. R.A.M.C.	14.
Prynne, H. V. .. ..	Woolwich .. ..	Med. Offi. Roy. Military Academy	7.
Purser, L. M., M.B. ..	Meerut .. ..	" " " "	13.14.
Rattray, M. MacG., M.B.	Woolwich .. ..	" " " "	—
Read, H. W. K. .. ..	Rangoon .. ..	Officer in charge Military Hospital	—
Riach, W., M.D. .. ..	London .. ..	Specialist in Ophthalmology Q.A. Military Hospital	2.7.
Richards, F. G. .. ..	Queenstown .. ..	Officer in charge Military Hospital	—
Riddick, G. B. .. ..	Aldershot .. ..	" " " "	—
Ritchie, T. F., M.B. ..	London .. ..	" " " "	—
Robinson, J. H. .. ..	Peshawar .. ..	Spec. in Midwifery, 1st (Peshawar) Division, Staff Surgeon	8.
Roch, H. S. .. ..	Pretoria .. ..	" " " "	3.
Rogers, H., M.B. .. ..	Malta .. ..	Officer in ch. Mil. Hosp., Forrest	—
Ronayne, C. R. L., M.B.	Gibraltar .. ..	Coy. Officer No. 28 Coy. R.A.M.C., Specialist in Ophthalmology	7.
Ross, N. H., M.B. .. ..	Fyzabad .. ..	Officer in charge Bde. Laboratory, Spec. in Prev. of Disease	3.
Rowan-Robinson, F. E., M.B.	Bermuda .. ..	Offi. in ch. Mil. Hosp. St. George's	—
Rutherford, N. J. C., M.B.	Cork .. ..	Sanitary Officer .. ..	2.
Rutherford, R., M.B. ..	Western Command .. ..	" " " "	—
Ryan, E. .. ..	Aldershot .. ..	Officer in charge Louise Margaret Families' Hosp., Spec. in Midwifery and Gynecology	8.
Safford, A. H. .. ..	Eastern Command .. ..	" " " "	2.3.
Samman, C. T. .. ..	Kamptee .. ..	Officer in charge Military Hospital	2.11.
Sampey, A. W. .. ..	Wellington .. ..	Officer in ch. Enteric Conv. Hosp.	2.9.
Scott, A. L. .. ..	Ahmednagar .. ..	Officer in charge Detention Hosp.	3.
Seeds, A. A., M.D. .. ..	Rawal Pindi .. ..	" " " "	—
Sewell, F. P., M.B. .. ..	Ceylon .. ..	Sanitary Officer .. ..	1.2.
Shoa, H. F., M.B. .. ..	Ambala .. ..	" " " "	—
Sheehan, G. F. .. ..	Cawnpore .. ..	Officer in Medical charge Harness and Saddlery Factory, Specialist in Mental Science	11.
Siberry, E. W. .. ..	London .. ..	Recruiting duties .. ..	—
Silver, J. P., M.B. .. ..	Tipperary .. ..	Officer in charge Military Hospital	—
Simson, H. .. ..	Muttra .. ..	" " " "	1.
Skelton, D. S. .. ..	Zanzibar .. ..	(Seconded under Foreign Office)	2.3.
Skinner, R. McK. .. ..	Lahore .. ..	" " " "	8.
Slyter, E. W., M.B. .. ..	Cahir .. ..	Officer in charge Military Hospital	—
Sloan, J. M., D.S.O., M.B.	Lahore Cantonment .. ..	D.A.D.M.S. (Mobn.) 3rd (Lahore) Division	1.
Smallman, A. B., M.D. ..	Aldershot .. ..	Asst. Inst. Sch. of Army Sanitation, Asst. San. Offi. A.C.	2.3.
Smith, C. S., M.B. .. ..	Dum Dum .. ..	Offi. in ch. Mil. and Departmental Foll. Hosp., Cant. Disp., Gun and Shell Factory	—
Smith, L. F., M.B. .. ..	Aden .. ..	Officer in charge Military Hospital	2.15.
Smith, S. B., M.D. .. ..	Belfast .. ..	Sanitary Officer Belfast District	2.
Smithson, A. E., M.B. ..	Dublin .. ..	Offi. in ch. Royal Infirmary and Detention Barracks, Arbor Hill	2.9.

*Special Qualifications.*

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |



Name.	Station.	Appointment.	Special Qualifications.
Sparkes, W. M. B.	West Africa	Officer in charge Military Hospital, Wilberforce	13.14.
Spiller, W. M. H., M.B.	Calcutta		2.3.
Staddon, H. E.	Rawal Pindi		—
Stallard, H. G. F.	Mhow	D.A.D.M.S. (Mohn.) 5th (Mhow) Division	—
Stammers, G. E. F.	Quetta	D. A. D. M. S. (Sanitary) (Quetta) Division	4th 1.2.
Statham, J. C. B.	London		2.3.9.
Steel, E. B., M.B.	Exeter	Officer in charge Military Hospital	11.
Steele, W. L.	Tidworth	Specialist in Operative Surgery	5.
Straton, C. H.	Pretoria	Sanitary Officer	1.2.
Swabey, M.	St. Thomas' Mount		12.
Sweetnam, S. W.		(Sick leave)	—
Symons, F. A., M.B.	Gosport		—
Taylor, H. S.	Fort George	Officer in charge Military Hospital	—
Taylor, W. J., M.B.		(West African leave)	2.10.
Thom, G. St. C., M.B.	Glasgow	D.A.D.M.S. Lowland Div. T.F.	13.14
Thompson, A. G., M.B.	Southern Command		2.
Thomson, C. G.	Glencorse	Officer in charge Military Hospital, Specialist in Dermatology	4.
Thorpe, L. L. G.	St. Thomas' Mount	Officer in charge Section Hospital	—
Thurston, H. S.	Dublin	Officer in charge Military Hospital, Portobello	—
Tibbits, W., M.B.	Ambala		—
Tobin, J.	Gibraltar	Offi. in charge Garrison Dispensary, Spec. in Midwifery and Gynæcology	8.
Tyacke, N.	Devonport		—
Tyndale, W. F., C.M.G., M.D.	„	Sanitary Officer Plymouth Dist.	1.2.
Unwin, T. B., M.B.		(West African leave)	—
Walker, F. S., F.R.C.S.I.	Queenstown Harbour	Officer in Medical charge Troops, Fort Camden	—
Walton, H. B. G.	Bareilly	Officer in ch. Bareilly Bde. Lab.	2.3.
Wanhill, C. F.	Mhow	D.A.D.M.S. (Sanitary) 5th (Mhow) Division	2.3.
Ward, W. A.	Bulford		4.
Waring, A. D., M.B.	Gosport	Recruiting duties	—
Waring, A. H.	„	Officer in charge Military Hospital	10.
Waters, W. J.	Tientsin		—
Watts, B.	London	Sanitary Officer, and in Medical charge Troops, St. John's Wood	2.8.
Webb, A. L. A.	Edinburgh	Sanitary Offi. Scottish Command	1.2.9.
Weld, A. E.	Malta	Officer in charge Military Families' Hospital, Valletta, Specialist in Midwifery and Gynæcology	8.
West, J. W., M.B.	Rawal Pindi	Spec. in Oper. Surg. 2nd (Rawal Pindi) Division	2.5.
Weston, A. F.	Jamaica	Offi. in ch. Mil. Hosp. Port Royal	3.
Whelan, J. F., M.B.	Poona	D.A.D.M.S. (San.) 6th (Poona) Div.	2.
Williamson, A. J., M.B.	Straits Settlements	Offi. in ch. Mil. Hosp., Tanglin, Specialist in Operative Surgery	5.
Wilson, R. C., M.B.	Gibraltar	Officer in charge Operating and X-ray Rooms	13.14.
Winder, J. H. R., M.D.	Aldershot	In Medical charge Families, Wellington Lines	—

*Special Qualifications.*

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynæcology. | 12. Pediatrics.                  | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Wingate, B. F. .. ..	London .. ..	Officer in Medical charge Troops, Wellington Barracks	—
Winkfield, W. B. .. ..	Maymyo .. ..	.. ..	—
Winslow, L. F. F. .. ..	Sheffield .. ..	Officer in charge Military Hospital	—
Wood, L. .. ..	Quetta .. ..	.. ..	—
Woodley, R. N. .. ..	Cardiff .. ..	Adjutant School of Instruction, R.A.M.C. T.F.	—
Woodside, W. A. .. ..	Agra .. ..	.. ..	—
Worthington, Sir E. S., Knt., M.V.O.	Canada .. ..	Med. Off. to Governor-General and Commander-in-Chief	5.
Wroughton, A. O. B. .. ..	Maidstone .. ..	Officer in charge Military Hospital	4.
Young, A. H. O. .. ..	Jullundur .. ..	Staff Surgeon and Civil Charge Jullundur Cantonment	—

## CAPTAINS.

Ahern, D. .. ..	Dublin .. ..	.. ..	—
Ahern, M. D. .. ..	Bermuda .. ..	.. ..	—
Amy, A. C., M.D. .. ..	Bury .. ..	.. ..	—
Anderson, J. A., M.B. .. ..	R.A.M. College .. ..	.. ..	9.
Anderson, R. G. .. ..	Egypt .. ..	Egyptian Army	—
Andrews, L. A. A. .. ..	York .. ..	Specialist in Dermatology	4.
Anthonisz, E. G. .. ..	R.A.M. College .. ..	.. ..	—
Archibald, R. G., M.B. .. ..	Egypt .. ..	Egyptian Army	—
Arthur, A. S., M.B. .. ..	Pembroke Dock .. ..	.. ..	—
Bagshawe, H. V. .. ..	Cairo .. ..	Sanitary Officer	1.
Beadnell, H. O. M. .. ..	Tidworth .. ..	.. ..	—
Beaman, W. K. .. ..	Northern Command .. ..	.. ..	—
Beckton, J. J. H. .. ..	Sialkot .. ..	.. ..	—
Bell, J. G., M.B. .. ..	Straits Settlements .. ..	.. ..	2.13.
Bell, W. J. E., M.B. .. ..	London .. ..	.. ..	2.
Benett, A. M. .. ..	Newport .. ..	Officer in charge Military Hospital	—
Bennett, J. A., M.B. .. ..	Cork .. ..	.. ..	—
Benson, C. T. V. .. ..	Madras .. ..	Officer in Med. charge H.E. the Governor's Body Guard, Staff Surgeon Fort St. George	—
Benson, W., M.B. .. ..	Aldershot .. ..	O.C. "C" Coy. Depôt R.A.M.C.	7.
Bevis, A. W. .. ..	R.A.M. College .. ..	.. ..	—
Blackwell, T. S. .. ..	Colchester .. ..	.. ..	1.
Blake, H. H., M.B. .. ..	Peshawar .. ..	.. ..	—
Bond, A. H. .. ..	R.A.M. College .. ..	.. ..	—
Booth, E. B., M.D. .. ..	West Africa .. ..	Off. in ch. Mil. Hosp., Tower Hill	—
Bowie, J. D., M.B. .. ..	Alexandria .. ..	.. ..	—
Bowle, C. W. .. ..	Enniskillen .. ..	Officer in charge Military Hospital	—
Bowle, S. C. .. ..	Newbridge .. ..	.. ..	16.
Boyd, J. E. M. .. ..	Ferozepore .. ..	Officer in charge Bde. Laboratory	—
Bracken, G. P. A. .. ..	Lichfield .. ..	.. ..	—
Bradish, F. L. .. ..	Curragh .. ..	Coy. Officer No. 17 Coy. R.A.M.C.	—
Bradley, F. H., M.B. .. ..	Allahabad .. ..	.. ..	—
Bramhall, C. .. ..	Birmingham .. ..	Adjutant School of Instruction, R.A.M.C. T.F.	—
Bridges, R. F., M.B. .. ..	Peshawar .. ..	.. ..	—
Bridges, R. H. .. ..	Manchester .. ..	Adjutant School of Instruction, R.A.M.C. T.F.	—
Brown, G. H. J., M.B. .. ..	Aberdeen .. ..	Officer in charge Military Hospital	3.
Browne, C. G. .. ..	R.A.M. College .. ..	.. ..	—

## Special Qualifications.

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|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Browne, T. W. .. .. .	Cork .. .. .	Officer in charge Bde. Laboratory and Staff Surgeon	2.6.
Browne, W. W. .. .. .	Ahmednagar .. .. .	Officer in charge Military Hospital	—
Bryden, R. A. .. .. .	Fleetwood .. .. .	Egyptian Army	2.3.
Buchanan, R. J. B. .. .. .	Netley .. .. .	Egyptian Army	—
Buist, D. S., M.B. .. .. .	Egypt .. .. .	Egyptian Army	—
Burney, W. H. S. .. .. .	Ferozepore .. .. .	Egyptian Army	—
Byam, W. .. .. .	Egypt .. .. .	Officer in charge Detention Hosp.	—
Byatt, H. V. B. .. .. .	Poona .. .. .	D.A.D.M.S. (Sanitary) 3rd (Lahore) Division	2.
Byrne, A. W., M.B. .. .. .	Lahore Cantonment .. .. .	—	—
Caddell, E. D., M.B. .. .. .	Dublin .. .. .	—	—
Cahill, R. J., M.B. .. .. .	Belfast .. .. .	—	2.
Campbell, J. H., M.B. .. .. .	Edinburgh .. .. .	Coy. Officer No. 13 Coy. R.A.M.C.	2.
Cane, A. S. .. .. .	Kirkee .. .. .	—	—
Carmichael, D. G., M.B. .. .. .	Sialkot .. .. .	—	—
Carmichael, J. C. G., M.B. .. .. .	Malta .. .. .	—	2.
Carruthers, V. T., M.B., F.R.C.S. Edin. .. .. .	Norwich .. .. .	—	—
Carson, H. W., M.B. .. .. .	Peshawar .. .. .	—	—
Carter, H. St. M., M.D. .. .. .	Aldershot .. .. .	Spec. in Oper. Surg. Camb. Hosp.	5.
Casement, F., M.B. .. .. .	Scottish Command .. .. .	—	—
Cassidy, C., M.B. .. .. .	Egypt .. .. .	Egyptian Army	—
Cathcart, G. E. .. .. .	Jubbulpore .. .. .	Staff Surgeon	6.
Chambers, G. O. .. .. .	Cairo .. .. .	—	—
Chapman, F. H. M. .. .. .	Meerut .. .. .	—	—
Churchill, G. B. F. .. .. .	R.A.M. College .. .. .	—	—
Clark, J. A., M.B. .. .. .	Egypt .. .. .	Egyptian Army	—
Clarke, C., M.B., F.R.C.S. .. .. .	Malta .. .. .	—	—
Clarke, F. A. H. .. .. .	Calcutta .. .. .	Officer in charge Bde. Laboratory	1.
Coates, T. S., M.B. .. .. .	Meerut .. .. .	—	—
Collet, G. G., M.B. .. .. .	„ .. .. .	Specialist in Dermatology, 7th (Meerut) Division	—
Collins, R. T. .. .. .	Glasgow .. .. .	—	—
Comyn, K., M.D. .. .. .	Gibraltar .. .. .	Officer in ch. Path. Laboratory	—
Connell, H. B. .. .. .	Liverpool .. .. .	Recruiting duties	—
Conway, J. M. H., F.R.C.S.I. .. .. .	Leeds .. .. .	Adjutant School of Instruction, R.A.M.C. T.F.	—
Conyngnam, C. A. T., M.B. .. .. .	Mhow .. .. .	Specialist in Dermatology, 5th (Mhow) Division	—
Cooke, O. C. P. .. .. .	Queenstown .. .. .	Off. in Med. ch. Troops, Haulbowline	—
Coppinger, C. J., M.B. .. .. .	R.A.M. College .. .. .	Clinical Pathologist	3.
Corbett, D. M., M.B. .. .. .	Ambala .. .. .	—	—
Cordner, R. H. L. .. .. .	Aldershot .. .. .	Off. in Med. ch. Royal Flying Corps	6.
Crawford, J. M. M., F.R.C.S.I. .. .. .	Ipswich .. .. .	Adjutant School of Instruction, R.A.M.C. T.F.	—
Cromie, M. J. .. .. .	West Africa .. .. .	—	—
Crossley, H. J. .. .. .	Bareilly .. .. .	—	—
Cummins, A. G., M.B. .. .. .	Egypt .. .. .	Egyptian Army	—
Cunningham, F. W. M., M.D. .. .. .	Sialkot .. .. .	Staff Surgeon	—
Dalglish, F. B. .. .. .	Jubbulpore .. .. .	Officer in Medical charge Gun Carriage Factory	—
Davidson, P., D.S.O., M.B. .. .. .	Aldershot .. .. .	Adjutant, Depot R.A.M.C.	6.
Davies, R. M., M.B. .. .. .	Pretoria .. .. .	Officer in Medical charge Detention Barracks	—
Davis, A. H. T. .. .. .	Poona .. .. .	Specialist in Electrical Science	—

#### Special Qualifications.

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|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Davy, P. C. T., M.B.	R.A.M. College		—
Dawson, A., M.B.	"		2.
Dawson, F. W. W., M.B.	Jullundur	Officer in charge Bde. Laboratory	—
Dawson, G. F., M.B.	Bareilly		—
De la Cour, G., M.B.	R.A.M. College		—
Denyer, C. H.	Agra		—
Dickenson, R. F. O'T.	Bareilly		2.
Dickson, H. S.	Gibraltar	Embarkation Medical Officer	—
Dickson, R. M., M.B.	Lucknow		—
Dickson, T. H., M.B.	Bareilly		—
Dill, M. G., M.D.	Ayr	Officer in charge Military Hospital	—
Dive, G. H., M.R.C.P.	Peking	" " " "	2.
Doig, K. A. C.	Meerut	" " " "	—
Douglass, J. H., M.D.	West Africa	Sanitary Officer	2.
Dowling, F. T., M.B.	Nowshera	Officer in ch. Cant. General Hosp.	—
Drew, C. M., M.B.	Egypt	Egyptian Army	—
Dudding, T. S.	Belgaum		2.
Duguid, J. H., M.B.	Secunderabad	Specialist in Otology	13.
Dunbar, B. H. V., M.D.	Belfast	Company Off. No.15 Coy.R.A.M.C.	—
Dunkerton, N. E.	London	Adjutant School of Instruction, 2nd London Div. R.A.M.C. T.F.	—
Dunn, W. J., M.B.	Thayetmyo	Officer in charge Military Hospital	—
Dunne, J. S., F.R.C.S.I.	R.A.M. College		—
Dwyer, P., M.B.	Dublin	Specialist in Otology and Coy. Off. No. 14 Coy. R.A.M.C.	2.13.
Dykes, S. S., M.B.	Lebong		—
Edmunds, C. T.	Bulford		—
Edwards, G. B.	Shorncliffe		—
Edwards, H. R.	Pretoria		—
Egan, W., M.B.	R.A.M. College		—
Ellcome, J. E.	Nowgong		—
Elliot, E. J., M.B.	Ashton	Officer in charge Military Hospital	—
Elliott, A. C., M.B.	Landguard Fort		—
Elvery, P. G. M.	Cairo		—
Emerson, H. H. A., M.B.	Leicester	Adjutant, School of Instruction, R.A.M.C. T.F.	3.
Eves, T. S., M.B.	Lucknow	Staff Surgeon	—
Fairbairn, J., M.B.	"	(West African leave)	—
Farebrother, H. W.	Meiktila	Officer in ch. Military Hospital	—
Fawcett, C. E. W. S., M.B.	Secunderabad		—
Fawcett, H. H. J.	Maidstone	Adjutant, School of Instruction, R.A.M.C. T.F.	6.
Ferguson, G. E.	York	Specialist in Operative Surgery	5.
Field, P. C.	Cairo		—
Field, S.	Irish Command		—
Forrest, F.	R.A.M. College		—
Forsyth, W. H., M.B.	"		9.
Foster, A. L.	Aden	Staff Surgeon Steamer Point	—
Foster, J. R.	Kilbride	Officer in Medical charge Troops	—
Foster, R. L. V., M.B.	Crownhill	" " " "	1.
Franklin, C. L., M.B.	Potchefstroom		—
Franklin, R. J.	Ferozepore		—
Fraser, A. D., M.B.	Netley	Clinical Pathologist	3.
Fraser, A. E. G.	Hounslow		—
Fraser, A. N., M.B.	Straits Settlements	Sanitary Officer	1.
Frost, A. T., M.B.	Poona	Spec. in Dermatology, 6th (Poona) Div. and in ch. No. 2 Section Hosp.	4.

*Special Qualifications.*

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|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Fyffe, E. L., M.B.	.. Poona .. ..	Officer in charge Cant. and Mil. Families' Hospital	—
Gale, R., M.B.	.. .. Egypt .. ..	Public Health Department	—
Gall, H.	.. .. Sialkot .. ..	.. ..	—
Galwey, W. R., M.B.	.. .. Wellington .. ..	D.A.D.M.S. (Sanitary), 9th (Secunderabad) Division	2.
Garland, F. J., M.B.	.. .. Colchester .. ..	Coy. Officer No. 9 Coy. R.A.M.C.	4.
Gater, A. W.	.. .. Winchester .. ..	.. ..	—
Gatt, J. E. H., M.D.	.. .. Benares .. ..	Officer in charge Military Hospital	2.9.
Gaunt, E. T., M.B.	.. .. Malta .. ..	.. ..	—
Gaunt, J. K., M.B.	.. .. " .. ..	Temporary duty at Scutari	—
Gibbon, E., M.B.	.. .. Egypt .. ..	Egyptian Army	—
Gibbon, T. H., M.D.	.. .. Dublin .. ..	Clinical Pathologist	3.
Gibson, H.	.. .. Kamptee .. ..	Officer in charge Cant. Hospital	—
Gibson, H. G.	.. .. R.A.M. College .. ..	.. ..	—
Gibson, L. G.	.. .. Amritsar .. ..	Off. in ch. Mil. and Cant. Hosp.	—
Gilmour, J., M.B., F.R.C.S. Edin.	.. .. Egypt .. ..	Public Health Department	—
Glanvill, E. M., M.B.	.. .. Newcastle .. ..	.. ..	—
Graham, J. H., M.B.	.. .. Cosham .. ..	.. ..	—
Grant, J. F., M.B.	.. .. Maymyo .. ..	Specialist in Electrical Science and Staff Surg. Burma Division	—
Grant, M. F., M.D.	.. .. London .. ..	Adjutant 1st London Div. School of Instruction, R.A.M.C. T.F.	2.
Gray, A. C. H., M.B.	.. .. R.A.M. College .. ..	Assistant Professor of Pathology	3.
Gregg, R. G. S., M.B.	.. .. Aden .. ..	Officer in charge Bde. Laboratory	2.
Grogan, J. B.	.. .. R.A.M. College .. ..	.. ..	—
Gurley, J. H.	.. .. Netley .. ..	Specialist in Ophthalmology	7.
Hallinan, T. J., M.B.	.. .. Multan .. ..	.. ..	2.
Hallowes, R. C., M.B.	.. .. Hollywood .. ..	.. ..	—
Hanafin, J. B., F.R.C.S.I.	.. .. Ambala .. ..	Specialist in Electrical Science 3rd (Lahore) Division	—
Hanafin, P. J.	.. .. Dublin .. ..	Specialist in Ophthalmology	2.7.
Harding, C. E. L., M.B.	.. .. Aden .. ..	.. ..	—
Harding, H., M.B.	.. .. Warley .. ..	.. ..	—
Harding, N. E. J., M.B.	.. .. London .. ..	Medical Officer of the Tower	9.
Harold, C. H. H., M.D.	.. .. Ambala .. ..	Officer in charge Northern Army Laboratory	—
Hart, H. P., M.B.	.. .. Cannanore .. ..	Officer in charge Military Hospital	—
Harty, T. E.	.. .. West Africa .. ..	Off. in ch. Mil. Hosp., Wonkufu	4.
Harvey, G. A. D.	.. .. R.A.M. College .. ..	Specialist in Physical Training	6.
Hastings, A. E. F.	.. .. " .. ..	.. ..	—
Hayes, A. H., M.R.C.P. Lond.	.. .. Ambala .. ..	Staff Surgeon and in Civil charge Ambala Cantonment	2.3.
Hayes, L. C., M.B.	.. .. Bermuda .. ..	Officer in ch. N.D. Hosp., Watford	2.
Hendry, A., M.B.	.. .. Colaba .. ..	.. ..	—
Heron, G. W.	.. .. Egypt .. ..	Public Health Department	—
Heslop, A. H., M.B.	.. .. Aldershot .. ..	.. ..	—
Hewson, F. M., F.R.C.S.I.	.. .. Karachi .. ..	Officer in ch. Followers' and Cantonment Hospitals	—
Hildreth, H. C., F.R.C.S. Edin.	.. .. Fermoy .. ..	Officer in ch. Mty. Fam. Hospital	8.
Hingston, J. C. L.	.. .. Rangoon .. ..	Spec. in Dermatology, Burma Div., Staff Surgeon Rangoon Brigade	—
Hoar, J. E.	.. .. Sheerness .. ..	.. ..	4.
Holden, C. W.	.. .. London .. ..	.. ..	2.9.
Hole, R. B., M.B.	.. .. Glasgow .. ..	Adjutant School of Instruction, R.A.M.C. T.F.	—

*Special Qualifications.*

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|------------------------------|-------------------------------|----------------------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Pediatrics.                  |
|                              |                               | 13. Otology.                     |
|                              |                               | 14. Laryngology.                 |
|                              |                               | 15. Specific Fevers.             |
|                              |                               | 16. Dental Surgery.              |

Name.	Station.	Appointment.	Special Qualifications.
Honeybourne, V. C.	.. R.A.M. College ..	..	—
Houston, J. W., M.B.	.. Peshawar ..	.. D.A.D.M.S. (Sani.) 1st (Peshawar) Division ..	—
Howell, F. D. G...	.. R.A.M. College ..	..	—
Howell, H. L.	.. Kirkee ..	.. Officer in ch. Native Section Hosp. and in Med. charge Ordnance Establishment ..	—
Howlett, A. W., M.B.	.. Bordon ..	..	—
Hughes, G. W. G.	.. Plymouth ..	.. Specialist in Ophthalmology ..	7.
Humfrey, R. E., M.B.	.. Secunderabad ..	..	1.
Hutchinson, V. P.	.. Potchefstroom ..	..	—
Ievers, O., M.B.	.. Shorncliffe ..	.. Officer in ch. "Helena" Hospital ..	8.
Irvine, A. E. S.	.. R.A.M. College ..	..	—
Irvine-Fortescue, A., M.B.	.. Japan ..	.. (Undergoing a course of study in the Japanese language) ..	—
Jacob, A. H.	.. R.A.M. College ..	..	—
James, J., M.B.	..	..	—
Johnson, B., M.B.	.. Limerick ..	..	—
Johnson, V. G.	.. R.A.M. College ..	..	—
Johnstone, D. P.	.. Jhansi ..	.. Staff Surgeon ..	2.9.
Jones, A. E. B., M.D.	.. Bangalore ..	.. Officer in charge Bde. Laboratory, Spec. in Prevention of Disease 9th (Secunderabad) Division ..	—
Jones, A. G., M.B.	.. Rawal Pindi ..	.. Spec. in Electrical Science ..	—
Jones, J. B., M.B.	.. Muttra ..	..	—
Joynt, H. F., M.B.	.. Cape Town ..	.. Officer in Medical charge Troops, Embarkation Medical Officer ..	—
Kavanagh, E. J., M.B.	.. R.A.M. College ..	..	—
Keane, G. J., M.D.	.. Uganda ..	.. (Seconded under Colonial Office) ..	2.9.
Keane, M...	.. Calicut ..	.. Officer in charge Military Hospital ..	—
Kelly, C., M.D.	.. Woolwich ..	..	—
Kelly, H. B., M.B.	.. Curragh ..	.. Officer in charge Military Families' Hospital ..	8.
Kelly, W. D. C., M.B.	.. Pretoria ..	.. Specialist in Operative Surgery ..	5.
Kempthorne, G. A.	.. Tregantle ..	.. Officer in Medical charge Troops ..	2.
Kinhead, R. C. G. M., M.B.	.. Bloemfontein ..	.. Officer in charge N.D. Hospital ..	—
Kyle, S. W., M.B.	.. Jubbulpore ..	..	—
Laing, F. R., M.B.	.. Lucknow ..	..	—
Lambert, F. C.	.. Poona ..	.. Spec. in Oper. Surg. 6th (Poona) Division ..	—
Lambkin, E. C., M.B.	.. Hong Kong ..	.. Company officer, No. 27 Coy. R.A.M.C. ..	—
Lane, J. W., M.D.	.. Lahore Cant. ..	..	—
Langrishe, J. du P., M.B.	.. Queenstown ..	.. Officer in Medical charge Troops, Spike Island ..	—
Lathbury, E. B.	.. Cork ..	..	—
Leahy, M. P., M.B.	.. R.A.M. College ..	..	—
Leckie, M.	.. Southern Command ..	..	—
Leeson, H. H.	.. Khartoum ..	..	—
Leslie, R. W. D.	.. R.A.M. College ..	..	—
Leslie, T. C. C.	.. Allahabad ..	..	—
Lewis, R. P.	.. Aldershot ..	.. Specialist in Physical Training ..	6.
Lewis, R. R.	.. West Africa ..	.. Officer in charge Military Hospital, Port Lokkoh ..	4.
Lewis, S. E., M.B.	.. Devonport ..	.. Officer in charge Military Families' Hospital ..	8.

*Special Qualifications.*

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|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Pediatrics.                  | 16. Dental Surgery.  |

Name.	Station	Appointment.	Special Qualifications
Lithgow, E. G. R. . . . .	Upavon . . . . .	Medical Offi. Central Flying School	—
Littlejohns, A. S. . . . .	R.A.M. College . . . . .	.. .. .	—
Lloyd, J. R. . . . .	Aden . . . . .	Officer in charge Section Hospital, Crater	—
Lloyd-Jones, P. A., M.B. . . . .	Aldershot . . . . .	Specialist in Ophthalmology	7.
Lochrin, M. J. . . . .	.. .. .	.. .. .	—
Loughnan, W. F. M. . . . .	Eastern Command . . . . .	.. .. .	2.9.
Low, N. . . . .	Colchester . . . . .	San. Officer Eastern Command	1.2.
Lucas, T. C., M.B. . . . .	Bombay . . . . .	Surg. to H.E. the Governor of Bombay	2.
Lunn, W. E. C., M.B. . . . .	Aldershot . . . . .	.. .. .	—
Lynch, J. P. . . . .	Canterbury . . . . .	.. .. .	—
MacArthur, D. H. C., M.D. . . . .	Sabathu . . . . .	.. .. .	—
MacArthur, W. P., M.D., F.R.C.P.I. . . . .	Mauritius . . . . .	Sanitary Officer	2.
McCammon, F. A., M.B. . . . .	R.A.M. College . . . . .	.. .. .	—
MacCarthy, D. T., M.B. . . . .	Mandalay . . . . .	Officer in charge Military Hospital	—
McCombe, J. S., M.B. . . . .	Secunderabad . . . . .	.. .. .	—
McConaghy, W., M.B. . . . .	Woolwich . . . . .	Coy. Officer Nos. 12 and 34 Coy. R.A.M.C.	—
McCreery, A. T. J., M.B. . . . .	Mhow . . . . .	.. .. .	—
MacDowall, W. MacD. . . . .	West Africa . . . . .	Officer in charge Military Hospital, Mabanta	—
McEntire, J. T., M.B. . . . .	Irish Command . . . . .	.. .. .	2.
McEwen, O. R. . . . .	.. .. .	.. .. .	—
McGrigor, D. B., M.B. . . . .	Agra . . . . .	.. .. .	—
Mackenzie, D. F., M.B. . . . .	Meerut . . . . .	Staff Surgeon	9.
Mackenzie, J., M.B. . . . .	Dinapore . . . . .	.. .. .	2.
McNeill, A. N. R., M.B. . . . .	Lichfield . . . . .	.. .. .	—
MacNicol, R. H., M.B. . . . .	Malta . . . . .	Specialist in Dermatology	4.
McQueen, C. . . . .	R.A.M. College . . . . .	.. .. .	—
McSheehy, O. W., M.B. . . . .	Maritzburg . . . . .	.. .. .	—
Manifold, J. A., M.B. . . . .	Bermuda . . . . .	Officer in charge N.D. Hospital, Warwick Camp	—
Marett, P. J. . . . .	Malta . . . . .	.. .. .	3.
Marshall, W. E., M.B. . . . .	Kinsale . . . . .	.. .. .	2.
Mathieson, W. . . . .	Pretoria . . . . .	.. .. .	—
Maughan, J. St. A. . . . .	Netley . . . . .	.. .. .	—
Maydon, W. G., M.B. . . . .	Liverpool . . . . .	Adjutant School of Instruction, R.A.M.C. T.F.	—
Meaden, A. A. . . . .	Colchester . . . . .	.. .. .	—
Meadows, S. M. W. . . . .	Tidworth . . . . .	Offi. in charge Mil. Fam. Hosp., Spec. Midwifery and Gynæcology	8.
Meldon, J. B., M.B. . . . .	Gibraltar . . . . .	.. .. .	—
Meredith, R. G., M.B. . . . .	Ceylon . . . . .	.. .. .	—
Middleton, E. M. . . . .	Chatham . . . . .	.. .. .	—
Millar, C. R. . . . .	Ballincollig . . . . .	.. .. .	—
Mitchell, T. J., M.B. . . . .	Lahore Cant. . . . .	Staff Surgeon	—
Mitchell, W., M.B. . . . .	Wrexham . . . . .	Officer in charge Military Hospital	—
Monteith, H. G. . . . .	Hong Kong . . . . .	.. .. .	—
Moore, E. H. M. . . . .	Shoeburyness . . . . .	.. .. .	—
Moriarty, T. B. . . . .	R.A.M. College . . . . .	.. .. .	—
Morris, C. R. M., M.B. . . . .	.. .. .	.. .. .	—
Moss, E. L. . . . .	Portsmouth . . . . .	Officer in ch. Mil. Fam. Hospital	8.
Murphy, L. . . . .	Malappuram . . . . .	Officer in charge Military Hospital	—
Newman, R. E. U., M.B. . . . .	R.A.M. College . . . . .	.. .. .	—
Nicholls, T. B., M.B. . . . .	Cyprus . . . . .	Officer in charge Military Hospital	—

*Special Qualifications.*

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynæcology. | 12. Paediatrics.                 | 16. Dental Surgery.  |



Name.	Station.	Appointment.	Special Qualifications.
Nicol, C. M., M.B.	.. Alexandria ..	.. ..	—
Nimmo, W. C.	.. Aldershot ..	Off. in Medical charge Families, Wellington Lines, Specialist in Midwifery and Gynæcology	8.
Nolan, R. H.	.. R.A.M. College ..	.. ..	—
O'Brien, C. W.	.. London ..	.. ..	—
O'Brien-Butler, C. P.	.. Kildare ..	Officer in charge Military Hospital	—
O'Carroll, A. D., M.B.	.. Alder-hot ..	.. ..	6.
O'Connor, A. P., M.B.	.. Khartoum ..	.. ..	—
O'Connor, R. D.	.. Northern Command ..	.. ..	—
Odium, B. A.	.. South Africa ..	(Seconded under Colonial Office)..	—
O'Farrell, W. R.	.. Egypt ..	Egyptian Army ..	—
O'Grady, D. de C.	.. Chatham ..	.. ..	—
O'Keeffe, J. J., M.B.	.. ..	.. ..	—
O'Kelly, R.	.. Delhi ..	.. ..	—
O'Neill, E. M., M.B.	.. R.A.M. College ..	.. ..	—
O'Riordan, W. H.	.. Rawal Pindi ..	Offi. in ch. Cant. General Hospital	—
Ormrod, G., M.B.	.. West Africa ..	Officer in ch. Military Hospital, Mount Auriol	7.
O'Rorke, C. H., M.B.	.. Darjeeling ..	.. ..	—
Osburn, A. C.	.. Netley ..	.. ..	4.
Otway, A. L., M.B.	.. Portsmouth ..	Sanitary Officer, Portsmouth Dist.	1.2.
Paine, E. W. M.	.. R.A.M. College ..	.. ..	—
Painton, G. R.	.. ..	.. ..	—
Pallant, S. L.	.. Netley ..	Officer in ch. Military Families' Hospital, Specialist in Otology	13.16.
Paris, R. C.	.. Quetta ..	Specialist in Dermatology 4th (Quetta) Division	—
Parkinson, G. S.	.. R.A.M. College ..	.. ..	—
Parsons-Smith, E. M.	.. Egypt ..	Egyptian Army ..	—
Pascoe, J. S.	.. Woolwich ..	Offi. in charge Mil. Fam. Hospital	8.
Patch, B. G.	.. India ..	.. ..	13.
Pennefather, E. M.	.. Multan ..	Staff Surgeon ..	—
Perry, H. M. J.	.. Devonport ..	Clinical Pathologist ..	3.
Petit, G.	.. Multan ..	.. ..	—
Phelan, E. C., M.B.	.. Barrackpore ..	.. ..	—
Phillips, T. McC., M.B.	.. Allahabad ..	Staff Surgeon ..	—
Pollard, A. M.	.. Colchester ..	.. ..	—
Potts, E. T., M.D.	.. Cosham ..	Coy. Officer No. 6 Coy. R.A.M.C.	—
Powell, J. E.	.. Hilsa ..	Specialist in Dermatology ..	4.
Power, P., M.B.	.. Poonamallee ..	Officer in charge Military Hospital and Specialist in Dermatology 9th (Secunderabad) Division	4.
Priest, R. C., M.B.	.. Allahabad ..	.. ..	—
Priestley, H. E.	.. R.A.M. College ..	.. ..	—
Purdon, W. B., M.B.	.. Belfast ..	.. ..	2.
Rahilly, J. M. B., M.B.	.. Shorncliffe ..	Specialist in Operative Surgery ..	5.
Ranken, H. S., M.B.	.. Egypt ..	Egyptian Army ..	—
Reed, G. A. K. H.	.. Aldershot ..	O.C. "A" Coy. Depôt R.A.M.C. and in charge Musketry	6.
Rees, G. H., M.B.	.. R.A.M. College ..	.. ..	—
Rennie, W. B., M.B.	.. Hyderabad ..	.. ..	—
Renshaw, J. A.	.. Wellington ..	Officer in ch. Cant. Hospital	—
Richard, G. H.	.. Weedon ..	Officer in charge Military Hospital	—
Richmond, J. D., M.B.	.. Edinburgh ..	Recruiting duties ..	—
Rigby, C. M.	.. Colaba ..	Embarkation Medical Officer ..	—
Ritchie, M. B. H., M.B.	.. Colchester ..	.. ..	—

*Special Qualifications.*

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynæcology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Robb, C., M.B. .. ..	Egypt .. ..	Public Health Department ..	—
Roberts, F. E. .. ..	Shorncliffe .. ..	.. ..	1.
Robertson, H. G., M.B. ..	Malta .. ..	Temporary duty at Scutari ..	—
Robinson, T. T. H., M.B.	R.A.M. College .. ..	.. ..	—
Roche, J. J. D., M.B. ..	Gibraltar .. ..	.. ..	—
Rose, A. M., M.B. .. ..	Longmoor .. ..	Officer in charge Reception Station	2.
Rudkin, G. F. .. ..	Dublin .. ..	.. ..	—
Rugg, G. F. .. ..	Peshawar .. ..	Specialist in Operative Surgery, 1st (Peshawar) Division	5.
Russell, H. W., M.D. ..	Ambala .. ..	Officer in ch. Sirhind Bde. Lab., Specialist in Prev. of Disease	3.
Ryles, C., M.B. .. ..	Alderney .. ..	Officer in charge Military Hospital	—
Ryley, C. .. ..	Bermuda .. ..	Sanitary Officer .. ..	2.
Sampson, F. C., M.B. ..	Woolwich .. ..	Specialist in Dermatology .. ..	4.
Sampson, P. .. ..	R.A.M. College .. ..	.. ..	2.
Saunders, S. McK. .. ..	Egypt .. ..	Egyptian Army .. ..	—
Scaife, C., M.D. .. ..	Belgaum .. ..	In charge Brigade Laboratory, Spec. in Prevention of Disease	2.
Scatchard, T. .. ..	Aldershot .. ..	Specialist in Dermatology, Connaught Hospital	4.
Scott, J. W. L. .. ..	R.A.M. College .. ..	.. ..	—
Scott, T. H., M.B. .. ..	Bradford .. ..	Officer in charge Military Hospital	—
Seccombe, J. W. S. .. ..	Topsham .. ..	Officer in Medical charge Troops	2.
Sexton, T. W. O. .. ..	R.A.M. College .. ..	.. ..	—
Shepherd, A., M.B. .. ..	Shwebo .. ..	Officer in charge Military Hospital	—
Sherlock, C. G., M.D. ..	Lahore Cant. .. ..	.. ..	—
Sherren, H. G. .. ..	London .. ..	.. ..	2.
Sidgwick, H. C., M.B. ..	Woolwich .. ..	Specialist in Operative Surgery	5.
Sim, J. A. B., M.B. .. ..	R.A.M. College .. ..	(Sick leave) .. ..	—
Simson, J. T., M.B. .. ..	Egypt .. ..	Egyptian Army .. ..	—
Sinclair, M., M.B. .. ..	London .. ..	Officer in Medical charge Troops, Chelsea and Kensington Bks.	—
Smales, W. C. .. ..	R.A.M. College .. ..	.. ..	—
Smyth, R. S., M.D. .. ..	.. ..	.. ..	—
Spong, W. A., M.B. .. ..	Karachi .. ..	Officer in charge Military Families' Hospital, Staff Surgeon, E.M.O.	—
Stack, G. H., M.B. .. ..	R.A.M. College .. ..	.. ..	—
Stack, H. T., M.B. .. ..	Ranikhet .. ..	Officer in charge Cant. Hosp. and Civil Surgeon	2.
Stallybrass, T. W., M.B.	Egypt .. ..	Egyptian Army .. ..	—
Stanley, H. V., M.B. .. ..	Gibraltar .. ..	.. ..	—
Startin, J. .. ..	Satara .. ..	Officer in charge Military Hospital	—
Stevenson, A. L., M.B. ..	Secunderabad .. ..	.. ..	—
Stevenson, G. H., M.B. ..	R.A.M. College .. ..	.. ..	—
Stewart, H., M.B. .. ..	.. ..	.. ..	—
Stewart, P. S., M.B. .. ..	Southern Command .. ..	.. ..	—
Stirling, A. D., M.B. .. ..	Cairo .. ..	.. ..	2.
Stoney, E. C., M.B. .. ..	Bhamo .. ..	Officer in charge Military Hospital	—
Storrs, R. .. ..	Dorchester .. ..	.. ..	8.
Stringer, C. H. .. ..	Jamaica .. ..	.. ..	—
Stuart, F. J., M.B. .. ..	Meerut .. ..	.. ..	—
Suhr, A. C. H., M.B. .. ..	Straits Settlements .. ..	Off. in ch. Mil. Hosp. Fort Canning	2.
Sutcliffe, A. A., M.B. .. ..	Chester .. ..	Cov. Officer No. 19 Coy. R.A.M.C.	1.
Sylvester-Bradley, C.R. ..	Exeter .. ..	Adjutant School of Instruction, R.A.M.C. T.F.	6.
Symons, V. H. .. ..	Seaforth .. ..	Officer in charge Military Hospital	—
Tabuteau, G. G. .. ..	Cork .. ..	Specialist in Operative Surgery ..	5.

*Special Qualifications.*

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|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otolaryngology.  |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Tate, R. G. H., M.D. ..	Dublin .. ..	.. ..	2.
Taylor, G. P., M.B. ..	Pretoria .. ..	Coy. Officer No. 23 Coy. R.A.M.C.	—
Thompson, R. J. C. ..	.. ..	(Sick leave) .. ..	—
Thompson, W. I., M.B. ..	Aldershot .. ..	.. ..	—
Thomson, C. P., M.D. ..	Egypt .. ..	Public Health Department	—
Thomson, D. S. B., M.B. ..	.. ..	Egyptian Army .. ..	2.
Thurston, L. V. ..	Aldershot .. ..	.. ..	—
Tobin, W. J. ..	Bangalore .. ..	.. ..	—
Todd, R. E., M.B. ..	Egypt .. ..	Public Health Department	—
Tomlinson, P. S. ..	Roorkee .. ..	.. ..	—
Treves, W. W., M.B., F.R.C.S.	Egypt .. ..	Public Health Department	—
Turnbull, J. A. ..	Jubbulpore .. ..	.. ..	6.
Turner, C. H. ..	Dublin .. ..	Specialist in Operative Surgery	5.
Turner, F. T. ..	.. ..	(Sick leave) .. ..	—
Varvill, B. ..	Mhow .. ..	Staff Surgeon .. ..	—
Vaughan, E. W., M.B. ..	Devonport .. ..	.. ..	—
Vaughan, W. F. H. ..	Malta .. ..	Specialist in Operative Surgery	5.
Vidal, A. C. ..	R.A.M. College .. ..	.. ..	—
Walker, N. D., M.B. ..	Quetta .. ..	Officer in Medical ch. Staff College	2.6.
Walker, S. G., M.B. ..	Cawnpore .. ..	Officer in charge Departmental Followers' Hospital	—
Wallace, G. S., M.B. ..	Bellary .. ..	.. ..	2.
Ware, G. W. W., M.B. ..	Kilkenny .. ..	Officer in charge Military Hospital	—
Watson, D. P., M.B. ..	Nyasaland .. ..	(Seconded under Colonial Office)	3.
Way, L. F. K. ..	Wynberg .. ..	.. ..	—
Webster, J. A. W. ..	Neemuch .. ..	Officer in ch. Cantonment Hosp.	—
Weddell, J. M. ..	Fyzabad .. ..	.. ..	—
Wells, A. G. ..	Scottish Command .. ..	.. ..	—
Weston, W. J. ..	R.A.M. College .. ..	.. ..	—
Wetherell, M. C., M.D. ..	Fethard .. ..	Officer in charge Military Hospital	—
White, C. F., M.B. ..	Dublin .. ..	Specialist in Dermatology	4.
White, M., M.B. ..	Shwebo .. ..	.. ..	—
White, R. K. ..	Aldershot .. ..	Offi. in Med. ch. Families, Marl- borough Lines, Spec. in Midwifery	8.
Whitehead, E. C., M.B. ..	Dinapore .. ..	.. ..	—
Wiley, W., M.B. ..	Dover .. ..	.. ..	—
Williams, A. S. ..	R.A.M. College .. ..	.. ..	—
Williamson, M. J., M.B. ..	South Africa .. ..	Offi. in Med. ch. Troops, Simonstown	—
Wilmot, R. C. ..	Hythe .. ..	Officer in charge Military Hospital, Specialist in Ophthalmology	7.
Wilson, H. T. ..	Chatham .. ..	Coy. Officer No. 10 Coy. R.A.M.C.	—
Wilson, M. O., M.B. ..	Eastern Command .. ..	.. ..	—
Winckworth, H. C. ..	India .. ..	.. ..	5.16.
Winder, A. S. M., M.B. ..	Lucknow .. ..	.. ..	—
Winder, M. G. ..	Jamaica .. ..	.. ..	—
Wood, A. E. B., M.B. ..	Tientsin .. ..	Offi. in Med. ch. Detention Brcks.	—
Wood, J. L. ..	Richmond .. ..	Officer in charge Military Hospital	—
Worthington, F., M.B. ..	Gravesend .. ..	.. ..	—
Wright, A. R., M.B. ..	Malta .. ..	.. ..	—
Wright, T. J. ..	Aldershot .. ..	O.C. "B" Coy. Dépôt R.A.M.C. and Assistant Instructor Train- ing Establishment	2.
Wright, W. G. ..	Gibraltar .. ..	.. ..	—
Wyatt, C. J., M.B. ..	West Africa .. ..	.. ..	—
Yourrell, J. R., M.B. ..	Rangoon .. ..	.. ..	—

*Special Qualifications.*

- |                              |                              |                                  |                      |
|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynecology. | 12. Pediatrics.                  | 16. Dental Surgery.  |

## LIEUTENANTS.

Name.	Station.	Appointment.	Special Qualifications.
Allison, G. F. .. ..	York .. ..	Coy. Officer No. 8 Coy. R.A.M.C.	—
Allnutt, E. B. .. ..	Purandhur .. ..	Officer in charge Military Hospital	—
Allott, H. W. L. .. ..	Bareilly .. ..	.. ..	—
Archer, T. C. R. .. ..	Hong Kong .. ..	.. ..	—
Balfour, T. H., M.B. .. ..	Inverness .. ..	Officer in charge Military Hospital	2.
Ball, W. O. W., M.B. .. ..	Longmoor .. ..	.. ..	—
Barry, S. J. .. ..	Poona .. ..	.. ..	—
Beddingfield, H., M.B. .. ..	Hounslow .. ..	.. ..	—
Beddows, E. C. .. ..	Curragh .. ..	.. ..	—
Biggam, A. G., M.B. .. ..	Rawal Pindi .. ..	.. ..	—
Biggar, B., M.B. .. ..	Cairo .. ..	.. ..	—
Bissett, W., M.B. .. ..	Dagshai .. ..	.. ..	—
Blackmore, H. S. .. ..	Bangalore .. ..	.. ..	2.16.
Blaikie, C. J. .. ..	" .. ..	.. ..	—
Blake, G. A., M.B. .. ..	Lucknow .. ..	.. ..	—
Breen, T. F. P., M.B. .. ..	R.A.M. College .. ..	(On probation)	—
Brett, P. M. J., M.B. .. ..	Jhansi .. ..	.. ..	—
Bridges, A. B. H. .. ..	London .. ..	.. ..	—
Brown, A. G., M.B. .. ..	Curragh .. ..	.. ..	—
Bruce, D. W., M.B. .. ..	Lahore Cantonment .. ..	.. ..	—
Buckley, L., M.B. .. ..	Ferozepore .. ..	.. ..	—
Burnett, M. .. ..	Poona .. ..	.. ..	—
Cane, E. G. S. .. ..	Colaba .. ..	Officer in ch. Brigade Laboratory	2.
Carlyle, R. C., M.B. .. ..	Malta .. ..	.. ..	—
Christie, W. F., M.B. .. ..	Straits Settlements .. ..	.. ..	—
Corbett, W. V. .. ..	London .. ..	.. ..	—
Cowen, E. G. H., M.B. .. ..	Agra .. ..	.. ..	—
Cowtan, F. C. .. ..	Woolwich .. ..	.. ..	—
Crocket, J., M.B. .. ..	Edinburgh .. ..	.. ..	—
Croker, W. P., M.B. .. ..	Dublin .. ..	.. ..	—
Davidson, F. C., M.B. .. ..	Fort George .. ..	.. ..	—
Davidson, R., M.B. .. ..	Lucknow .. ..	.. ..	—
Davies, A. A. M. .. ..	" .. ..	.. ..	—
Deane, E. C. .. ..	Bareilly .. ..	.. ..	—
Dunbar, L., M.B. .. ..	Lucknow .. ..	.. ..	—
Dyas, G. E. .. ..	R.A.M. College .. ..	(On probation)	—
Elliott, J. M., M.B. .. ..	Rawal Pindi .. ..	.. ..	—
Finny, C. M., M.B. .. ..	" .. ..	.. ..	2.
Flood, R. A., M.B. .. ..	Woolwich .. ..	.. ..	—
Fretz, W. L. E., M.B. .. ..	Ambala .. ..	.. ..	—
Frobisher, J. H. M., M.B. .. ..	Lucknow .. ..	.. ..	—
Frost, W. A., M.B. .. ..	Kamptee .. ..	.. ..	—
Gill, J. G., M.B. .. ..	R.A.M. College .. ..	(On probation)	—
Graham, W. T., M.B. .. ..	Calcutta .. ..	.. ..	—
Gwynne, J. Fitz. G., M.B. .. ..	R.A.M. College .. ..	(On probation)	—
Hare, J., M.B. .. ..	Belfast .. ..	.. ..	—
Hattersley, S. M., M.B. .. ..	R.A.M. College .. ..	(On probation)	—
Hayes, P., M.B. .. ..	Bangalore .. ..	.. ..	—
Heale, A. S. .. ..	Rawal Pindi .. ..	.. ..	—
Helm, C. .. ..	Dublin .. ..	.. ..	—
Hemphill, R., M.B. .. ..	Netley .. ..	.. ..	—
Hepper, J. E. .. ..	Oxford .. ..	.. ..	—
Higgins, S. J. .. ..	Lucknow .. ..	.. ..	—
Hood, A., M.B. .. ..	Rawal Pindi .. ..	.. ..	—
Hudleston, I. R. .. ..	Jamaica .. ..	.. ..	—

## Special Qualifications.

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|------------------------------|------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.        | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.        | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.            | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment.	Special Qualifications.
Huggan, J. L., M.B.	London		—
Ingoldby, C. M.	Rawal Pindi		—
Jackson, A.	Dublin		—
Jones, C. C., M.B.	London		—
Kidd, J. D., M.B.	Secunderabad		—
Laird, W. B.	Bangalore		—
Lang, E. C., M.B.	Curragh		—
Large, D. T. M., M.B.	India		—
Large, S. D.	Aldershot	Officer in ch. Reception Station, Ewshott	—
L'Estrange, H. R.	Mauritius	Officer in charge Mil. Fam. Hosp.	—
Levack, J. S., M.B.	Nowshera		—
Linzell, S. J., M.B.		(On probation = seconded)	—
Little, C. J. H., M.B.	Rawal Pindi		—
Lothian, N. V., M.B.	R.A.M. College	(On probation)	11.
MacIlwaine, A. G. J.	Quetta		—
McNaughtan, W., M.B.	"		—
Mallam, R. K., M.B.	Rawal Pindi		—
Martyn, A. F. C.	Aldershot		—
Menzies, A. J. A., M.B.	R.A.M. College	(On probation)	—
Morrison, W. K., M.B.	"	( " " )	—
O'Connell, J. F., M.B.	Aldershot		—
Osmond, T. E.	Ambala		—
Panton, H. F., M.B.	Rawal Pindi		—
Percival, E., M.B.	R.A.M. College	(On probation)	—
Phillipps, R. B.	Cork		—
Poole, L. T., M.B.	York		—
Porter, R. E., M.B.	Limerick		—
Power, P. M. J.	Winchester		—
Pratt, W. W., M.B.	India		—
Price, R. B., M.B.	London		—
Rankin, H. C. D., M.B.	Aldershot		—
Reynolds, D., M.B.	Attock	Officer in charge Military Hospital	—
Richardson, D. T., M.B.	Poona		—
Rintoul, D. W., M.B.	R.A.M. College	(On probation)	—
Ritchie, J. L., M.B., F.R.C.S.	Rawal Pindi		—
Robinson, F. A., M.B.	Nasirabad		—
Rowe, J., M.B.	Deeptut		—
Russell, E. U.	Woolwich		—
Sealy, H. N.	Kildare		—
Seaver, C. D. K.	Jullundur		—
Shaw, R. G., M.B.	Curragh		—
Shields, H. J. S.	Caterham		—
Shore, L. R.		(On probation = seconded)	—
Skrimshire, F. R. B.	Bangalore		—
Smith, E. P. A., M.B.	Lucknow		—
Smith, S. H.	Woolwich		—
Spence, B. H. H., M.B.	Rawal Pindi		—
Sproule, J. C.	Devonport		—
Steven, W. S. R., M.B.	Quetta		—
Stevens, N. W., M.B.	Dover		—
Stevenson, W. B., M.B.	Rawal Pindi		2.
Stewart, W., M.B.	Agra		—
Strachan, E. A., M.B.	Barcilly		—
Stubbs, J. W. C., M.B.	R.A.M. College	(On probation)	—
Sykes, S. P., M.B.	Jutogh		—

### Special Qualifications.

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|------------------------------|-------------------------------|----------------------------------|----------------------|
| 1. State Medicine.           | 5. Operative Surgery.         | 9. Diploma in Tropical Medicine. | 13. Otology.         |
| 2. Diploma in Public Health. | 6. Physical Training.         | 10. Skiagraphy.                  | 14. Laryngology.     |
| 3. Bacteriology.             | 7. Ophthalmology.             | 11. Psychological Medicine.      | 15. Specific Fevers. |
| 4. Dermatology.              | 8. Midwifery and Gynaecology. | 12. Paediatrics.                 | 16. Dental Surgery.  |

Name.	Station.	Appointment	Special Qualifications
Tamplin, F. S. .. ..	Gibraltar .. ..	.. ..	.. ..
Thompson, T. O., M.B. .. ..	.. ..	(On probation = seconded)	.. ..
Thornton, C. V., M.B. .. ..	Curragh .. ..	.. ..	.. ..
Todd, H. C., M.B. .. ..	Secunderabad .. ..	.. ..	.. ..
Urquhart, A. L., M.B. .. ..	R.A.M. College .. ..	.. ..	.. ..
Vint, R. W., M.B. .. ..	Lucknow .. ..	.. ..	.. ..
Vivian, R. T. .. ..	Bangalore .. ..	.. ..	.. ..
Wade, E. W., M.B. .. ..	.. ..	(On probation = seconded)	.. ..
Warburton, P. D. .. ..	R.A.M. College .. ..	( " " )	.. ..
Watson, A., M.B. .. ..	" .. ..	( " " )	2.9.
Webster, W. L., M.B. .. ..	Cairo .. ..	.. ..	.. ..
Wells, H. J. G., M.B. .. ..	Rawal Pindi .. ..	.. ..	.. ..
Weston, T. A., M.B. .. ..	Lucknow .. ..	Specialist in Operative Surgery 8th (Lucknow) Division	.. ..
Whitby, E. V., M.B. .. ..	Fermoy .. ..	.. ..	.. ..
Whitehead, N. T., M.B. .. ..	Woolwich .. ..	.. ..	.. ..
Wigmore, J. B. A. .. ..	Aldershot .. ..	.. ..	.. ..
Wilson, G., M.B. .. ..	Secunderabad .. ..	Staff Surgeon	.. ..
With, P. A. .. ..	Bangalore .. ..	.. ..	.. ..
Woodhouse, B. .. ..	.. ..	(On probation = seconded)	.. ..
Wynne, O. W. J. .. ..	Allahabad .. ..	.. ..	.. ..

## QUARTERMASTERS.

## HONORARY MAJORS.

Name.	Station.
Hasell, H. G. .. ..	Malta.
Short, J. B. .. ..	Dublin.

## HONORARY CAPTAINS.

Archibald, W. N. .. ..	Netley.
Audus, H. J. F. .. ..	Tidworth.
Chalk, A. J. .. ..	London.
Clapshaw, A. .. ..	Pretoria.
Cowan, R. R. .. ..	Aldershot.
Crookes, F. .. ..	Woolwich.
Exton, T. .. ..	Dover.
Gillman, J. .. ..	Dépôt, Aldershot.
Glover, H. W. .. ..	Chester.
Green, J. .. ..	York.
Hall, F. W. .. ..	Netley.
Houghton, E. .. ..	"
Lunney, A. .. ..	Curragh.
Offord, E. P. .. ..	Cosham.
Spackman, H. .. ..	Chatham.
Wakefield, H. P. .. ..	Tidworth.
Watkins, J. .. ..	Aldershot.
Wheeler, A. .. ..	Shorncliffe.
Wilson, A. .. ..	Southampton.
Woolley, H. .. ..	Devonport.

## Special Qualifications.

1. State Medicine.	5. Operative Surgery.	9. Diploma in Tropical Medicine.	13. Otology.
2. Diploma in Public Health.	6. Physical Training.	10. Skiagraphy.	14. Laryngology.
3. Bacteriology.	7. Ophthalmology.	11. Psychological Medicine.	15. Specific Fevers.
4. Dermatology.	8. Midwifery and Gynæcology.	12. Pediatrics.	16. Dental Surgery.

## HONORARY LIEUTENANTS.

Name.	Station
Buckley, E. J. .. .. .	Dublin.
Clark, J. .. .. .	Woolwich.
Collard, F. E. .. .. .	York.
Conway, T. D. .. .. .	Devonport.
Cooper, C. H. .. .. .	Hong Kong.
Downing, R. N. .. .. .	Woolwich.
Green, R. H. .. .. .	Egypt.
Jones, L. .. .. .	Edinburgh.
Kinsella, C. W. .. .. .	Egypt.
McColgin, T. E. .. .. .	South Africa.
Newland, E. W. .. .. .	Malta.
Osborne, J. W. .. .. .	Colchester.
Packard, J. T. .. .. .	London.
Saunders, E. V. .. .. .	Cork.
Smith, C. H. .. .. .	North China.
Spencer, W. T. .. .. .	Gibraltar.
Tait, A. F. .. .. .	Aldershot.
Ward, E. E. .. .. .	Belfast.
Wilson, J. .. .. .	War Office.
Woollard, J. .. .. .	Dublin.

## MEDICAL OFFICERS OF THE HOUSEHOLD CAVALRY.

Rank.	Name.	Regiment.
Surgeon-Major .. .. .	Cowie, R. M. .. .. .	1st Life Guards.
" .. .. .	Pares, B. .. .. .	Royal Horse Guards.
" .. .. .	Power, J. H. .. .. .	2nd Life Guards.
Surgeon-Captain .. .. .	Bodington, P. J., M.B. .. .. .	Royal Horse Guards.
" .. .. .	Luxmore, E. J. H. .. .. .	2nd Life Guards.
Surgeon-Lieutenant .. .. .	Anderson, E. D. .. .. .	1st Life Guards.

## RETIRED MEDICAL OFFICERS OF THE REGULAR ARMY WHO ARE EMPLOYED.

Name.	Station where Employed.
Allport, Major C. W., M.D. .. .. .	Great Yarmouth.
Archer, Lieut.-Colonel T., M.D. .. .. .	Lydd.
Austin, Lieut.-Colonel H. W. .. .. .	Fort Stamford.
Baird, Lieut.-Colonel A., M.B., F.R.C.S. Edin. .. .. .	Worcester.
Barnes, Lieut.-Colonel R. W. .. .. .	Dorchester.
Battersby, Lieut.-Colonel H. L. .. .. .	Ipswich.
Beavor, Lieut.-Colonel W. C., C.M.G., M.B. .. .. .	D.A.D.M.S. North Midland Division, Territorial Force, Lichfield.
Bourke, Lieut.-Colonel U. J. .. .. .	Hamilton.
Browne, Colonel A. L., M.D. .. .. .	Taunton.
Browne, Lieut.-Colonel A. W. .. .. .	Armagh.
Burke, Major J. F. .. .. .	Penally.
Butt, Colonel E., F.R.C.S.I. .. .. .	D.A.D.M.S. 2nd London Division, Terri- torial Force, London.
Butterworth, Major S. .. .. .	Carlisle.
Chambers, Major A. J. .. .. .	Lichfield.
Charlesworth, Lieut.-Colonel H., C.M.G. .. .. .	Nottingham.
Clements, Lieut.-Colonel W. G. .. .. .	Christchurch.
Coutts, Lieut.-Colonel G., M.B. .. .. .	Chichester.
Davoren, Major V. H. W. .. .. .	Bury St. Edmunds.
Dowman, Lieut.-Colonel W. S. .. .. .	Kingston-on-Thames.
Duggan, Major C. W., M.B. .. .. .	Lincoln.
Duncan, Lieut.-Colonel S. E. .. .. .	Shrewsbury.



Name.				Station where Employed.	
Freeman, Major E. C., M.D.	..	..	..	..	D.A.D.M.S. East Anglian Division, Territorial Force, Warley.
Greig, Lieut.-Colonel F. J.	..	..	..	..	Stirling.
Gubbin, Lieut.-Colonel G. F.	..	..	..	..	D.A.D.M.S. 1st London Division, Territorial Force, London.
Haywood, Lieut.-Colonel L., M.B.	..	..	..	..	D.A.D.M.S. South Midland Division, Territorial Force, Warwick.
Holmes, Major C. J., M.D., F.R.C.S.I.	..	..	..	..	Lancaster.
Hopkins, Major C. H.	..	..	..	..	Devizes.
Hosie, Lieut.-Colonel A., M.D.	..	..	..	..	Sandown.
Jackson, Major R. W. H., M.D.	..	..	..	..	Weymouth.
James, Lieut.-Colonel H. E. R., C.B., F.R.C.S.	..	..	..	..	War Office.
Kay, Lieut.-Colonel A. G., M.B.	..	..	..	..	Clifton, Bristol.
Kearney, Lieut.-Colonel J., M.D.	..	..	..	..	Landguard Fort.
McCormack, Major R. J., M.D.	..	..	..	..	Omagh.
McCreery, Lieut.-Colonel B. T., M.B., F.R.C.S.I.	..	..	..	..	Perth.
Mansfield, Major G. S., M.B.	..	..	..	..	St. Peters, Jersey.
Morris, Lieut.-Colonel W. A.	..	..	..	..	Scarborough.
Mosse, Lieut.-Colonel C. G. D., F.R.C.S.I.	..	..	..	..	Guernsey.
Myles, Major E. H., M.B.	..	..	..	..	"
Nichols, Lieut.-Colonel F. P., M.B.	..	..	..	..	Taunton.
Nicolls, Lieut.-Colonel J. M., M.B.	..	..	..	..	Detention Barracks, Cork.
Osburne, Lieut.-Colonel J.	..	..	..	..	Galway.
Peeke, Major H. S.	..	..	..	..	Derby.
Power, Major R. I.	..	..	..	..	Waterford.
Poynder, Lieut.-Colonel G. F.	..	..	..	..	Bedford.
Reilly, Major C. W.	..	..	..	..	Bodmin.
Riordan, Lieut.-Colonel J., M.B.	..	..	..	..	Clonmel.
Robinson, Surgeon-Lieut.-Colonel G. S.	..	..	..	..	Eastbourne.
Rowney, Lieut.-Colonel W., M.D.	..	..	..	..	Manchester.
Scanlan, Lieut.-Colonel A. De C.	..	..	..	..	Guildford.
Spence, Major A. E. C., M.B.	..	..	..	..	Warwick.
Thomson, Lieut.-Colonel W. B.	..	..	..	..	Northampton.
Trewman, Lieut.-Colonel G. T., M.B.	..	..	..	..	Reading.
Trotter, Major W. J.	..	..	..	..	Naas.
Tuckey, Lieut.-Colonel T. B. A.	..	..	..	..	Detention Barracks, York.
Turner, Lieut.-Colonel W.	..	..	..	..	D.A.D.M.S. Welsh Div., Territorial Force, Shrewsbury.
Wade, Major G. A., M.D., F.R.C.S.I.	..	..	..	..	Horfield.
Whitty, Lieut.-Colonel M. J., M.D.	..	..	..	..	Liverpool.
Wight, Lieut.-Colonel E. O.	..	..	..	..	D.A.D.M.S. Home Counties Division, Territorial Force, Hounslow.
Williams, Major E. M.	..	..	..	..	Leicester.
Woods, Lieut.-Colonel C. R., M.D., F.R.C.S.I.	..	..	..	..	Birr.









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